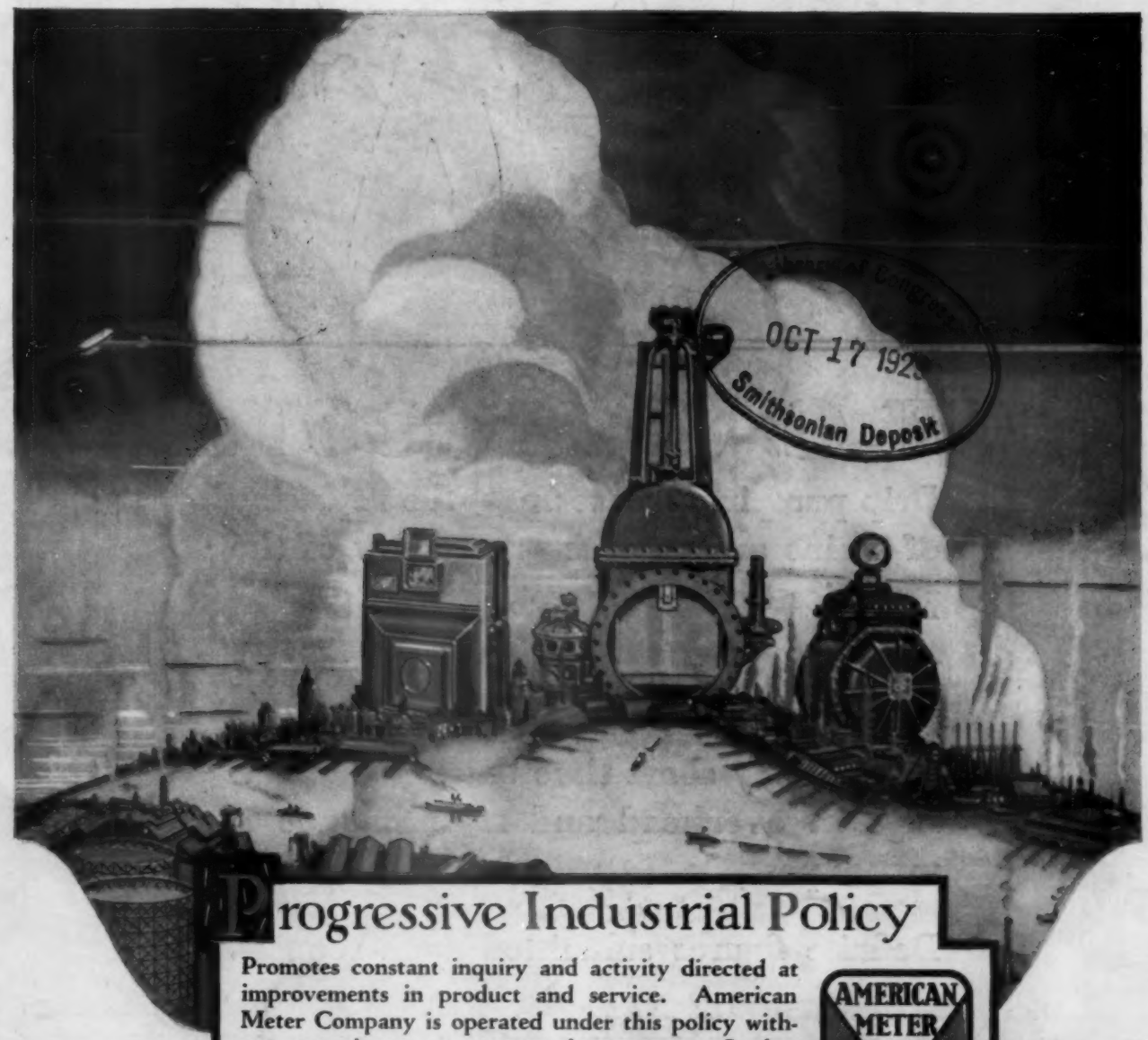
Vol. 131, No. 4 OCTOBER, 1929 Price 25 Cents

AMERICAN GAS JOURNAL

Established 1859 Pioneer of the Gas Industry

Including · GAS INDUSTRY · Est. 1900 ·



Progressive Industrial Policy

Promotes constant inquiry and activity directed at improvements in product and service. American Meter Company is operated under this policy without experiment at customer's expense. It has brought the beneficial result of an authoritative Leadership in Gas Measurement Engineering.

AMERICAN METER CO
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"WET GAS *is* COSTLY"

Drip pumping, freeze-ups,—the replacing of mains and meters—are a few of the penalties exacted by wet, impure, gas.

Dehydration, as performed by the Koppers Patented Process—will pay for itself in a surprisingly short time through the savings in overhead and maintenance it makes possible.

Definite figures submitted upon request.

THE WESTERN GAS CONSTRUCTION COMPANY
FORT WAYNE IND.
SUBSIDIARY OF THE KOPPERS COMPANY

AMERICAN
GAS JOURNAL
Established 1859 *Pioneer of the Gas Industry*
Including GAS INDUSTRY Est. 1900

Executive and Editorial Offices, 53 Park Place, New York City

S. G. KRAKE, *President and Treasurer* A. M. GLEASON, *Secretary*

H. M. RILEY, *Editor*

R. S. MCBRIDE, *Consulting Editor*, Washington, D. C.

Vol. 131, No. 4 October, 1929 Whole Number 3670

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AMERICAN GAS JOURNAL, October, 1929, Vol. 131, No. 4. Published monthly by American Gas Journal, Inc., at 34 Crystal St., East Stroudsburg, Pa. Executive, Editorial, and Business offices at 53 Park Place, New York, N. Y. Entered as second-class matter, October 17, 1928, at the postoffice of East Stroudsburg, Pa., under the Act of March 3, 1879.

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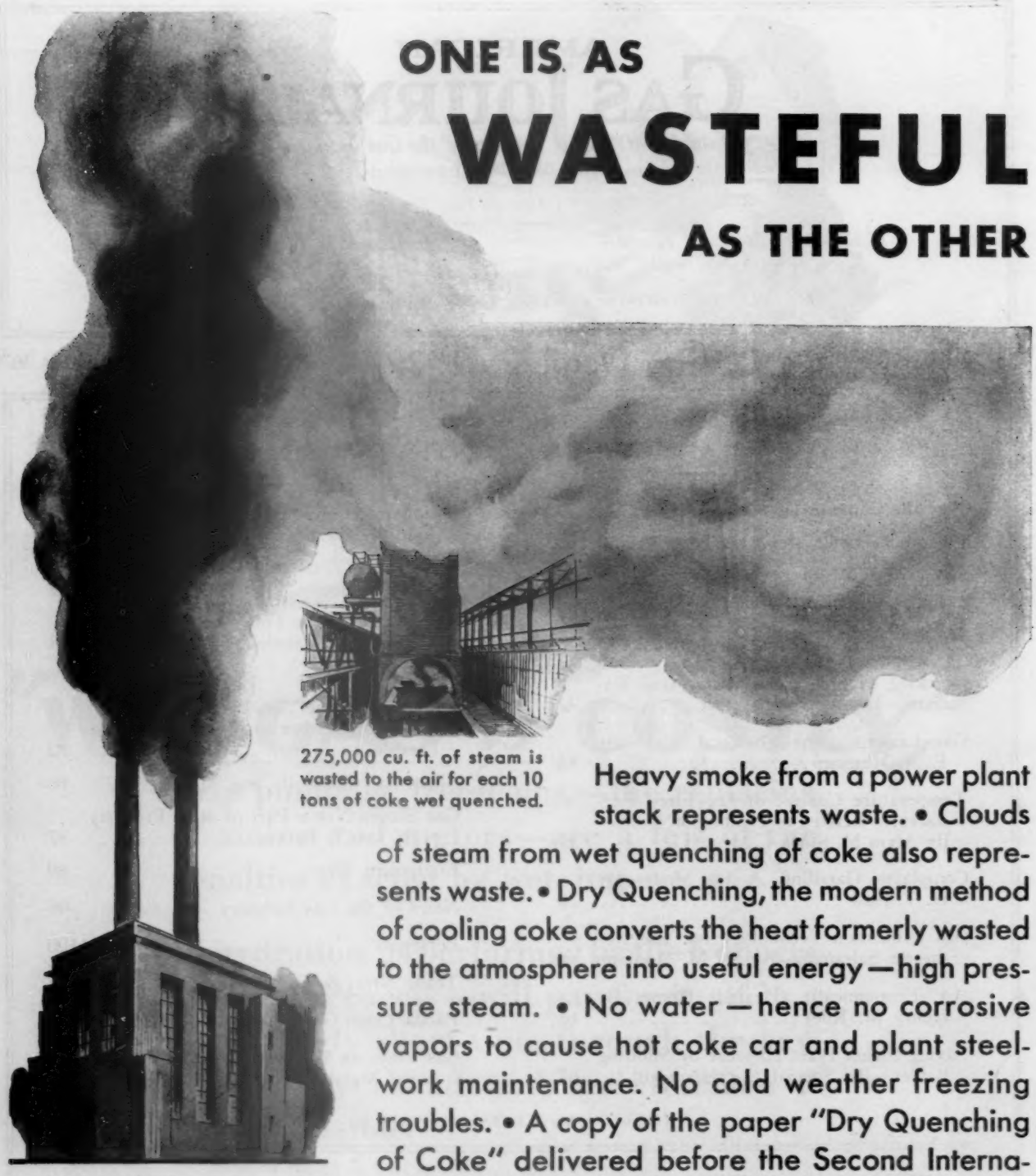
ONE IS AS WASTEFUL AS THE OTHER



275,000 cu. ft. of steam is wasted to the air for each 10 tons of coke wet quenched.

10,000 lb. of high pressure steam could be produced from this waste by Dry Quenching.

Heavy smoke from a power plant stack represents waste. • Clouds of steam from wet quenching of coke also represents waste. • Dry Quenching, the modern method of cooling coke converts the heat formerly wasted to the atmosphere into useful energy—high pressure steam. • No water—hence no corrosive vapors to cause hot coke car and plant steelwork maintenance. No cold weather freezing troubles. • A copy of the paper "Dry Quenching of Coke" delivered before the Second International Conference on Bituminous coal will be sent to those interested in Dry Quenching.

DRY QUENCHING EQUIPMENT CORPORATION

International Combustion Building • 200 Madison Ave., New York

A SUBSIDIARY OF INTERNATIONAL COMBUSTION ENGINEERING CORPORATION

THE BACKRUN GAS PROCESS AS APPLIED TO WATER GAS APPARATUS BY THE SEMET-SOLVAY ENGINEERING CORPORATION

The ***Backrun*** gives to Carbureted Water Gas Equipment a distinct advantage in heat economy.

The ***Backrun*** reduces fuel consumption per MCF and increases the capacity of the machine.

The ***Backrun*** removes obstacles to the effective use of bituminous coal for generator fuel.

The ***Backrun*** affords a method of producing lower specific gravity Carbureted Water Gas.

The ***Backrun*** lengthens the life of linings and checkerbrick.

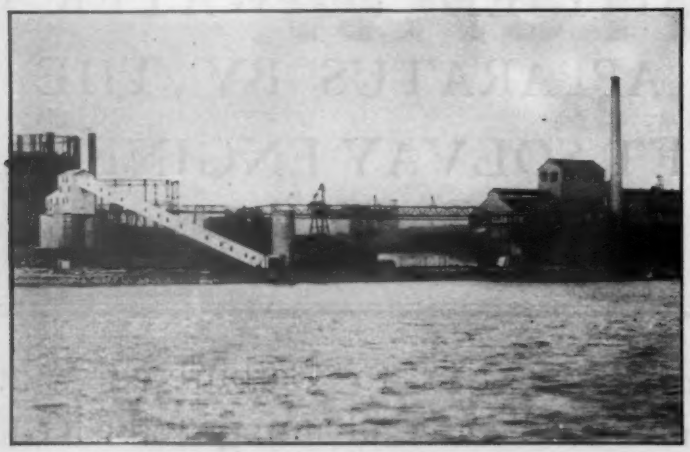
The ***Backrun*** provides a means of disposing of plant effluent, and in so doing generates part of the process steam required.

The ***Backrun*** wherever installed, will pay for itself in decreased holder cost of Carbureted Water Gas.

The ***Backrun*** can be installed on existing water gas apparatus.

SEMET-SOLVAY
ENGINEERING CORPORATION
Division Allied Chemical and Dye Corp.
40 RECTOR ST. NEW YORK

U. G. I. VERTICAL CHAMBER OVEN



Wisconsin Gas and Electric Company at Racine, Showing U. G. I. Vertical Chamber Oven plant

Average Operating Results

	Dubuque	*Racine*	*Clinton*
Daily capacity — cu. ft.	698,000	3,030,000	594,000
Corrected Gas in cu. ft per lb. of dry coal—	6.4	7.64	6.85
per ton of dry coal—	12,88	15,280	13,700
Heat units in gas per lb. of dry coal — B. t. u.	3,605	4,005	3,721

THE U. G. I. Vertical Chamber Oven is the latest advance in carbonizing equipment for gas company use and offers these advantages:

Designed for the manufacture of gas with coke as a by-product

Produces domestic coke of the highest quality

"Steaming" gives dilution without addition of inerts

Flexibility of operation with coal gas heating

Low maintenance due to low operating temperatures, rugged construction and gravity discharge

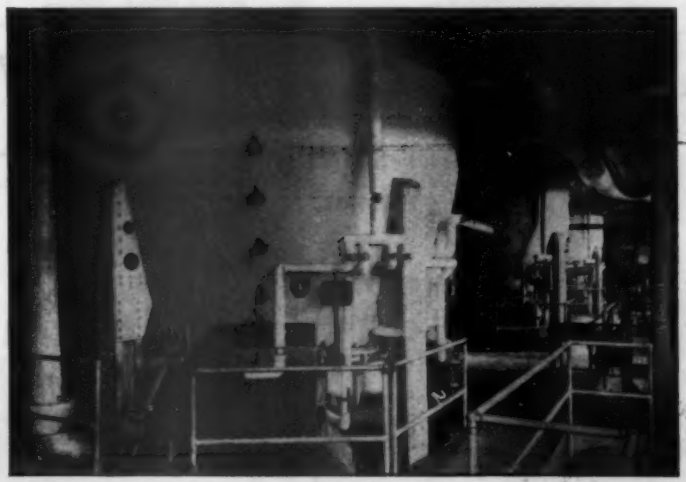
Low labor cost due to simplicity of operation and regulation

High capacity per square foot of ground space

U. G. I. Vertical Chamber Ovens have been installed at Racine, Wis., Dubuque, Ia. and Clinton, Ia. and are under construction at Bangor, Me. and at Racine (second unit).

Visit Booths 731 to 739 at the A. G. A. Convention

U. G. I. MECHANICAL GENERATOR



Three U. G. I. Mechanical Generators at Philadelphia Gas Works Company

Results from the operation of three U. G. I. Mechanical Generators at Philadelphia

Daily Capacity	*Generator Fuel per M.*	*B. t. u. of Gas*
15,000,000 cu. ft.	*25 lbs.*	*530*

THE U. G. I. Mechanical Generator offers the following important advantages:

Continuous operation for extended periods
Low fuel consumption
Low carbon loss in ash
Low maintenance
Heat otherwise lost recovered as steam
Bituminous coal may be used as fuel

The U. G. I. Mechanical Generator is self-clinkering, and with the U. G. I. Automatic Charger, provides a completely automatic controlled and operated water gas set from fuel bin to ash car.

Fifteen U. G. I. Mechanical Generators and nine U. G. I. Automatic Chargers have been installed or are now in process of installation.

THE U. G. I. CONTRACTING COMPANY

DIVISION OF

UNITED ENGINEERS & CONSTRUCTORS

INCORPORATED

DWIGHT P. ROBINSON, PRESIDENT

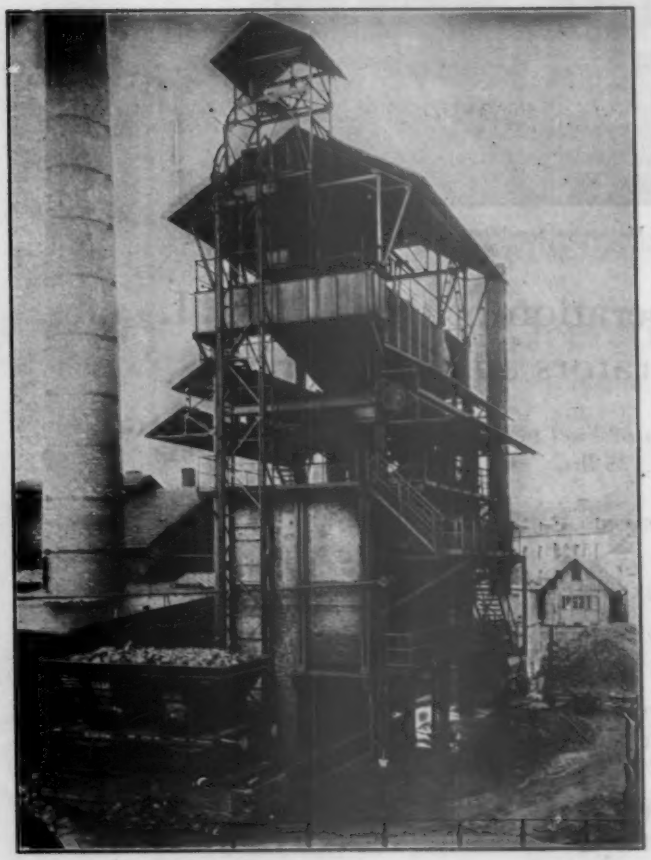
Chicago Broad and Arch Streets, Philadelphia New York

MAXIMUM RETURN TO CLIENTS PER DOLLAR INVESTED

"INDUGAS"

VERTICAL CHAMBER OVEN

With Water-sealed Drop Door
INTERMITTENT TYPE



Minimum Labor
Low First Cost

The annual operating reports of the Association of Swiss Gas Plants disclose that the "INDUGAS" ovens produce the largest yields of gas per ton of coal.

The following table shows the actual average yields from coal containing less volatile matter than the average American coal:

City	Time	Yield cu. ft. per net ton	Heating value B.t.u. (gross)
Baden, Switzerland	4 years average	14075	560
Olten, Switzerland	2 " "	13317	570
Friedrichshafen, Germany	4 " "	16045	515

There's a Reason
Full information, layouts and estimates gladly furnished

INDUGAS COMPANY, Inc.

114 LIBERTY STREET, NEW YORK

Saved $859.50 on New Baffles

HYTEMPITE

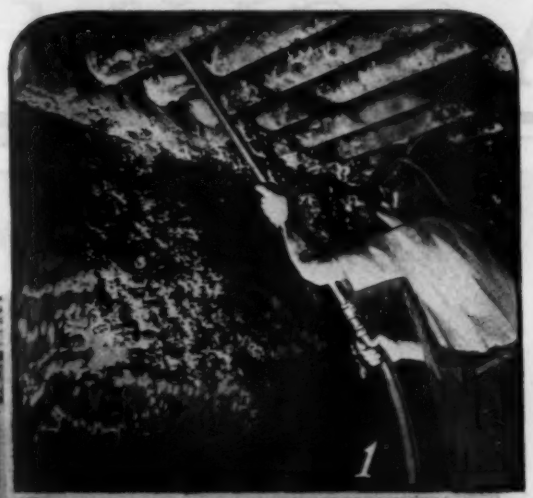
(REG. U. S. PAT. OFF.)

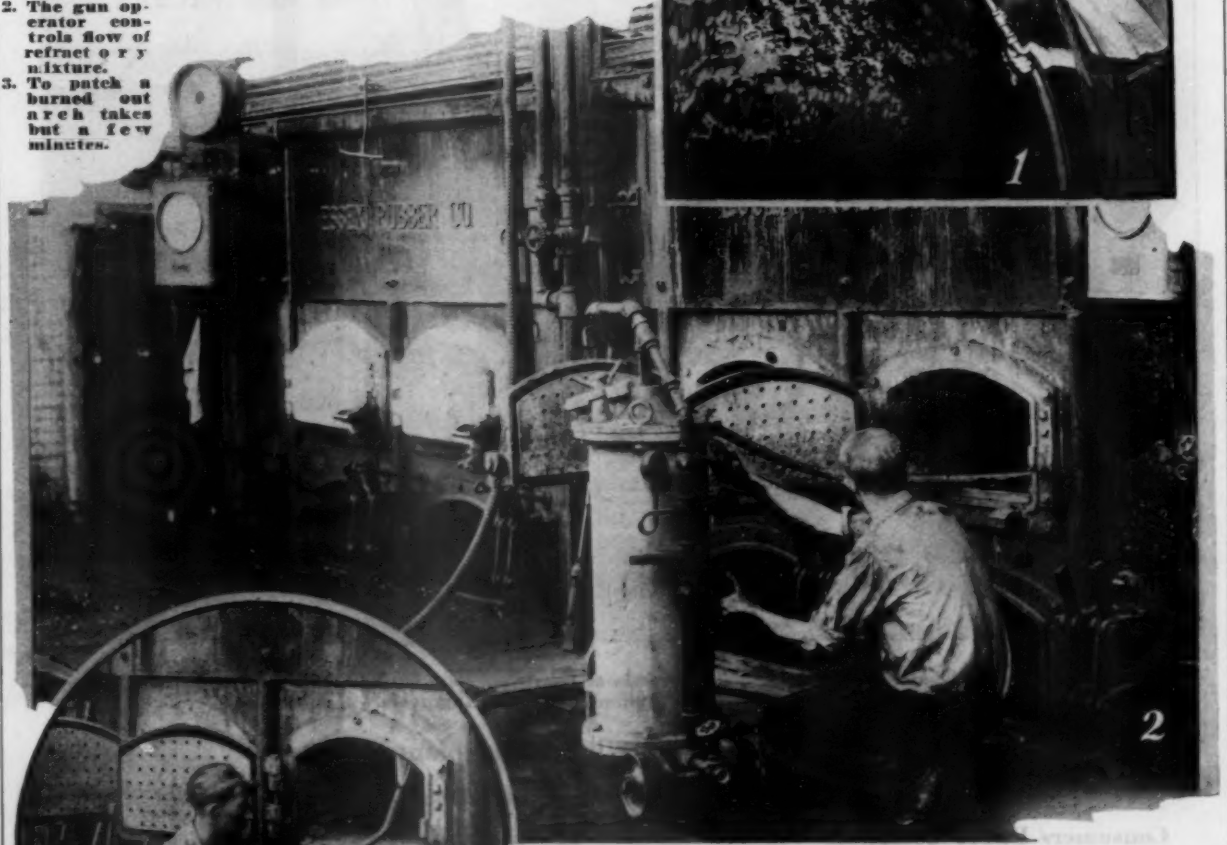
and the

Quigley Refractory Gun

Were used to rebaffle three Edge Moor boilers at this Power Plant.

1. See how the long gun nozzle is used.
2. The gun operator controls flow of refractory mixture.
3. To patch a burned out arch takes but a few minutes.





Compare These Costs

Estimated cost of 6 new tile baffles..		$1200.00
Cost of Monolithic Baffles:		
7400 lbs. plastic mixture of Hytempite and refractory material...	226.70	
1 Bag Portland Cement.....	.70	
200 ft. lumber (for forms).....	24.00	
55 hrs. labor @ $1.00.....	55.00	
55 hrs. labor @ .62.....	34.10	
Total.....		340.50
Amount Saved.....		$859.50

Mr. Smith, Chief Engineer, says:—

"In our plant high stack temperatures clearly showed the need for tighter baffling. The old baffles were beyond repair. We had a Quigley Refractory Gun which we were using around the plant for hot patching. When we learned that we could build complete baffles with this gun by shooting plastic refractory mixture against the wood form, we did the job with our own boiler room crew.

Our saving on building six baffles was $859.50. The gun originally cost $425.00 so it more than paid for itself on this one job. We use the gun for quick repairs on our furnace walls, arches, etc."

Write for booklet and address of our nearest Agent

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56 West 45th Street New York

REFRACTORY MATERIALS FOR FURNACE CONSTRUCTION AND MAINTENANCE
ACID PROOF CEMENTS ACID AND ALKALI PROOF COATINGS

Stock and Service through Agents in Every Industrial Center

SMOOT STEAM ACCUMULATOR

This interesting Smoot Steam Accumulator installation is at the Cedar Rapids Gas Company, Cedar Rapids, Iowa. The Western Gas Construction Company, Engineers.

Recent additions to the long list of gas plants equipped with Smoot Steam Accumulator and Control System.

Consumers Power Company
Lansing, Michigan
Stevens & Wood, Inc., Engineers
United Engineers & Constructors, Inc., Constructors

Consumers Power Company
Jackson, Michigan
Stevens & Wood, Inc., Engineers
Semet-Solvay Engineering Corp., Constructors

Brooklyn Borough Gas Company
Coney Island, N. Y.
The Western Gas Construction Company, Engineers

The Public Service Company of Northern Illinois
Gas Station No. 22
Ottawa, Illinois

SMOOT ENGINEERING CORPORATION
136 Liberty Street **New York**

SMOOT CONTROL

TO BETTER SERVE THE GAS INDUSTRY

We Want You to Know—

That we actually desire to help you, and further, that we really can help you. And we know that there are so many ways in which we can give you valuable assistance but this space does not permit their mention.

However, during the American Gas Association Convention we have made arrangements for you at Booth 574 so that you may stop and discuss with us any problems now confronting you regarding plant operation and better results.

Men of experience will greet you and a hearty welcome awaits you.

Looking Forward with pleasure to Your Visit

at **BOOTH 574**

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CONNERSVILLE
Blowers - Gas Pumps - Meters - Cycloidal Pumps

are important factors in production and distribution equipment.

Lower operating costs — dependable service — positive results — are qualities of service that have caused gas engineers to select Connersville products and then re-order for their next installations. Do you have descriptive bulletins?

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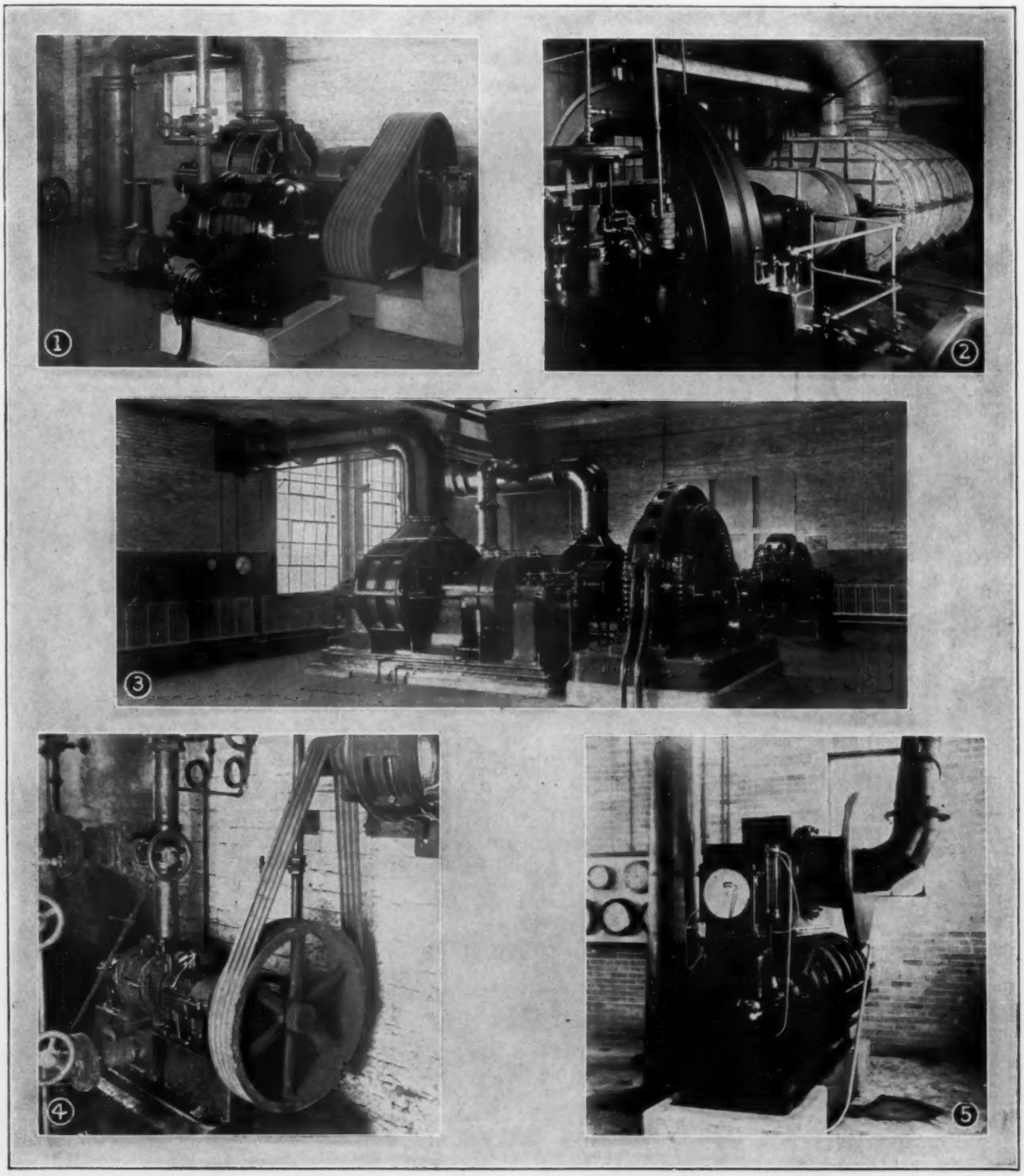
BLOWERS — GAS PUMPS — METERS — CYCLOIDAL PUMPS

[CONNERSVILLE]

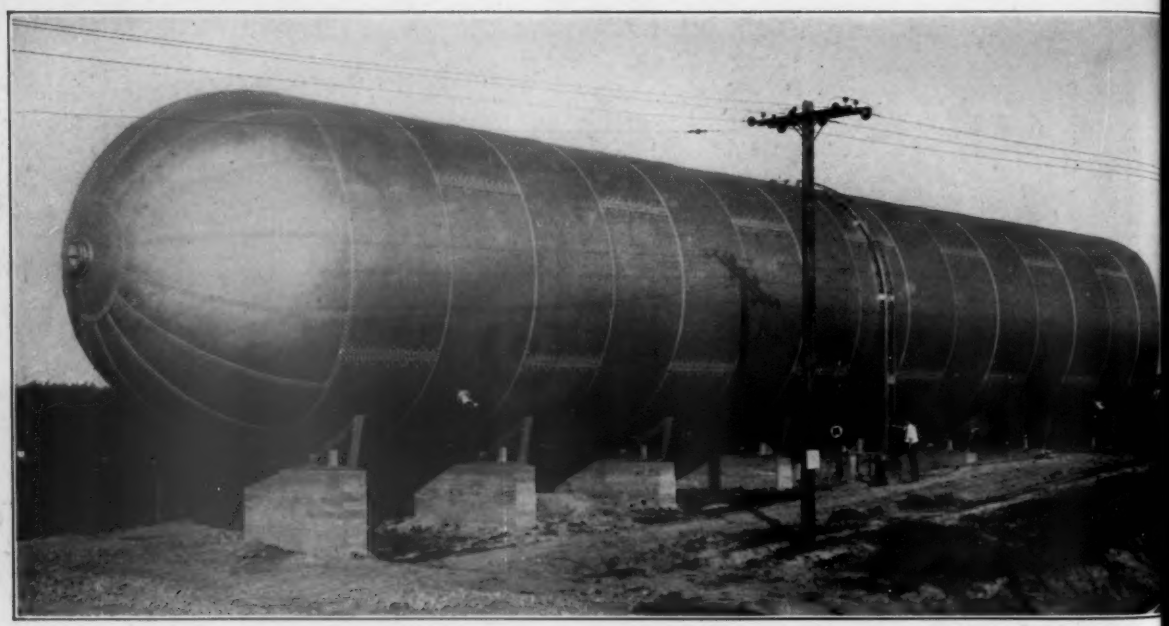


(1) 120,000 cu. ft. per hour Connersville Booster. (2) Connersville Positive Pressure Blower for Water Gas Sets. (3) Two 500,000 cu. ft. per hour High Pressure Connersville Gas Boosters. (4) Cycloidal Tar Pump. (5) The Connersville Meter with P.V.T.T. Recorder.

BLOWERS — GAS PUMPS — METERS — CYCLOIDAL PUMPS

THE BUILDERS
FOR SEVENTY

An enviable record of over three-quarters of a century, is our contribution to the Gas Industry. In all that time the unqualifiedly high character of our products has been maintained, which has been proved by the number of reorders we are receiving.



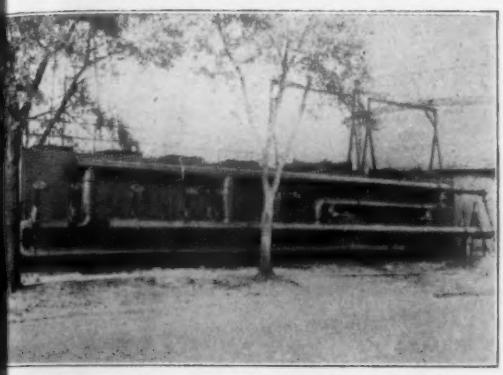
This pressure holder was erected in 10 days faster than contract time at St. Joseph, Mich., for the Interstate Fuel & Light Co. It is 24 feet in diameter and 140 feet 9 inches long.

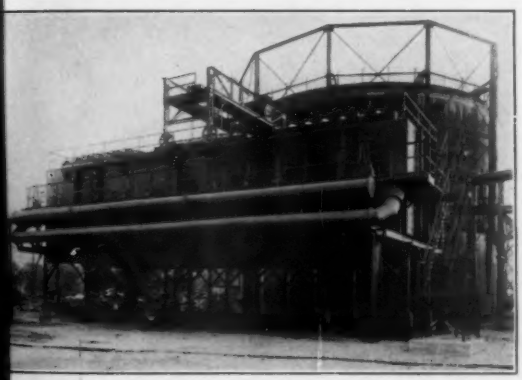
Pioneers in the Building of HIGH PRESSURE GAS HOLDE

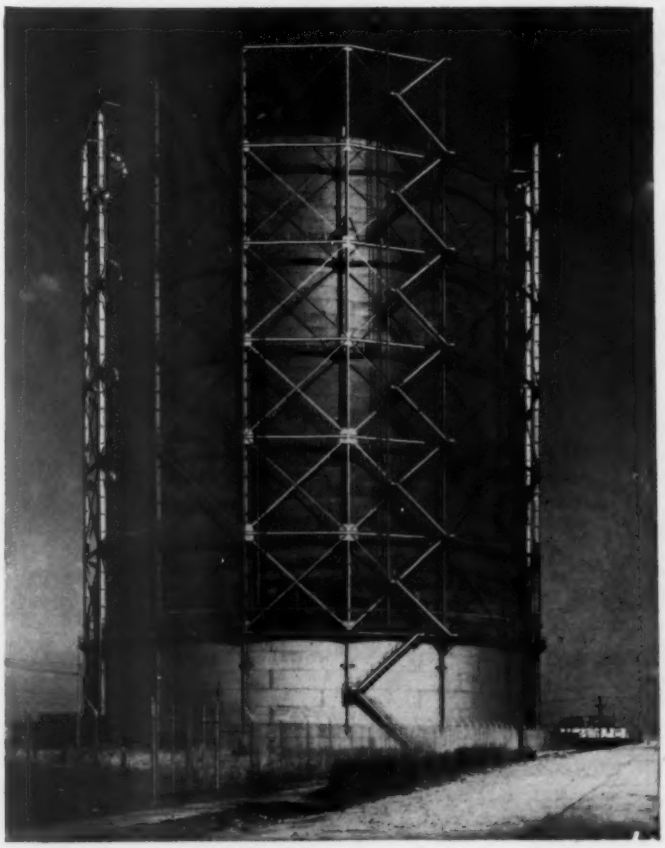
OF LARGE VOLUMETRIC CAPACITY EITHER IN THE HORIZONTAL OR VERTICAL TYPES

GAS PLANT EQUIPMEN

OF *STACEY* HOLDERS
— EIGHT YEARS —







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BOOTH 621-23 A. G. A. CONVENTION

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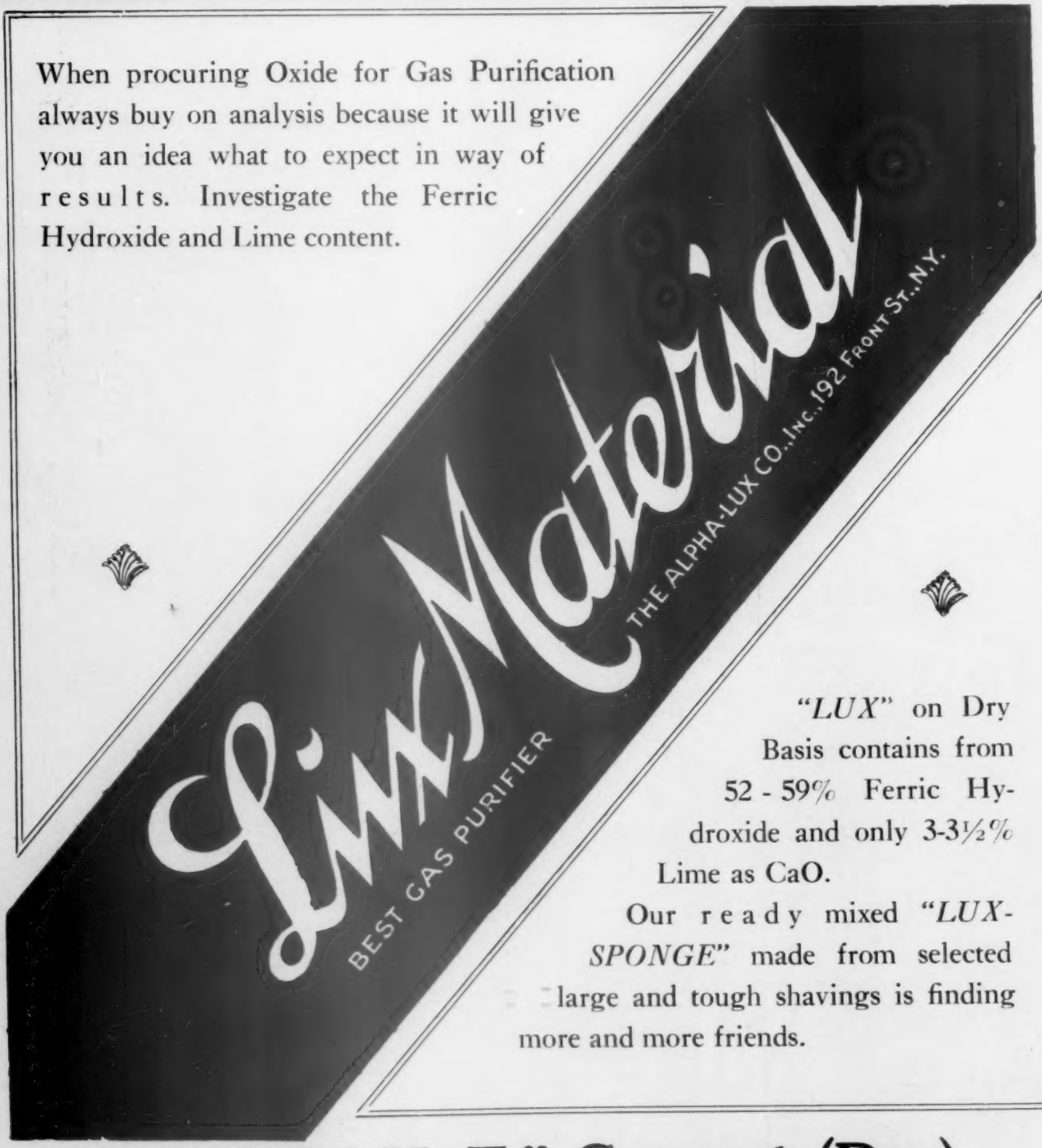


"LUX" on Dry Basis contains from 52 - 59% Ferric Hydroxide and only 3-3½% Lime as CaO.

Our ready mixed *"LUX-SPONGE"* made from selected large and tough shavings is finding more and more friends.

"LUXIT H. T." Cement (Dry)

For Patching Hot Retorts, Refractory Linings, etc. Shipped in 110 lb. bags.

Order Sample Shipment Today!

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

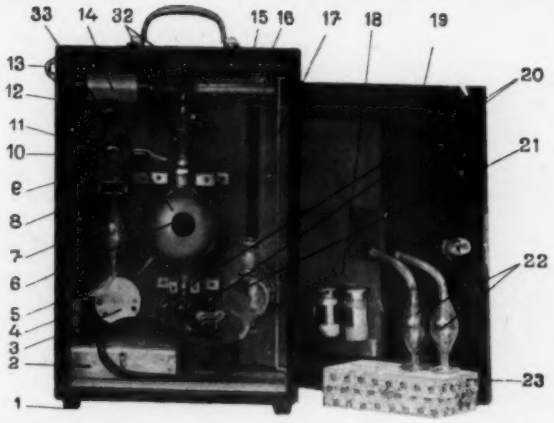
THE ALPHA—

192 FRONT STREET

HAND CALORIMETER

Dr. Strache-Kling (Loeffler Model)

For Determining the Heating Value of Gases



1. It is portable (weight under 10 lbs.)
2. It is accurate.
3. It requires only small quantities of gas for each determination.
4. It requires no water connection.
5. A determination can be made in one minute.
6. It can be operated by anybody without special training.
7. It does not require standardizing by H_2+O gas.
8. Its cost is reasonable.

The principle involved is the burning of an air gas mixture, of a known quantity of gas with a definite volume of air, in an explosion pipette insulated by means of a Dewar Vacuum jacket.

The temperature rise is recorded on an inserted thermometer. Each instrument is equipped with a computer table.

DR. OTT-LUX-GAS TESTER

For Indicating Change in Gravity of Gas, also in Heating Value of Gas

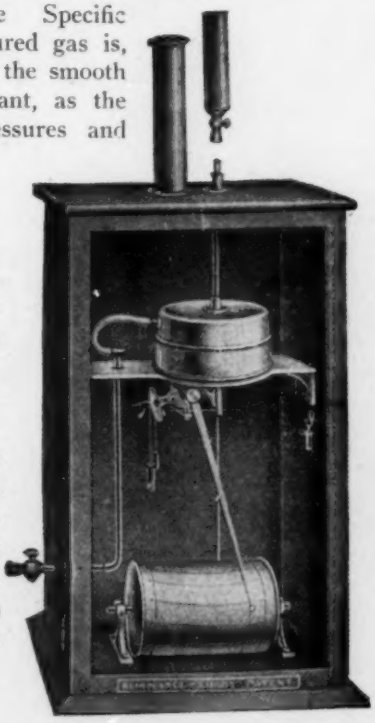
Dr. Ott - Lux - Gas - Tester is most simple in construction and operation. It combines in one operation the information usually obtained by three distinct time absorbing manipulations, namely, the **Gas Analysis, Specific Gravity determination** and **Calorimeter test.** While it is true that it cannot replace any of the three tests, where specific results are required it is equally true that it will show any changes in the gas, which are caused by **changes in composition, gravity** or **heating value.**

LUX-RECORDING GAUGE

For Specific Gravity of Gas

(Simmance and Abady System)

To determine the Specific Gravity of manufactured gas is, today, as essential to the smooth running of a gas plant, as the determination of pressures and heating values.



In the Simmance Abady System-Lux-Recording Specific Gravity balance, we have an instrument which will give us, at a glance, not only any changes that may have occurred at any time, but furnishes a permanent record of the Specific Gravity of the gas throughout the 24 hours of the day.

LUX COMPANY INC.

NEW YORK CITY, N. Y.

LAVINO OXIDE

FOR GAS PURIFICATION

HIGH ACTIVITY
LARGE CAPACITY

Supplied for Mixing at your plant

LAVINO SPONGE

Carefully made with Large, Tough Shavings, Reducing Back Pressure and Box Changes.

Have you received your copies of

"Dry Box Purification."

"Chemical Analysis of Gas Purifying Material."

See our miniature purification plant at the Convention.

Booths—642-743

E. J. LAVINO AND COMPANY, BULLITT BLDG., PHILA., PA.

Chicago—208 So. LaSalle St.
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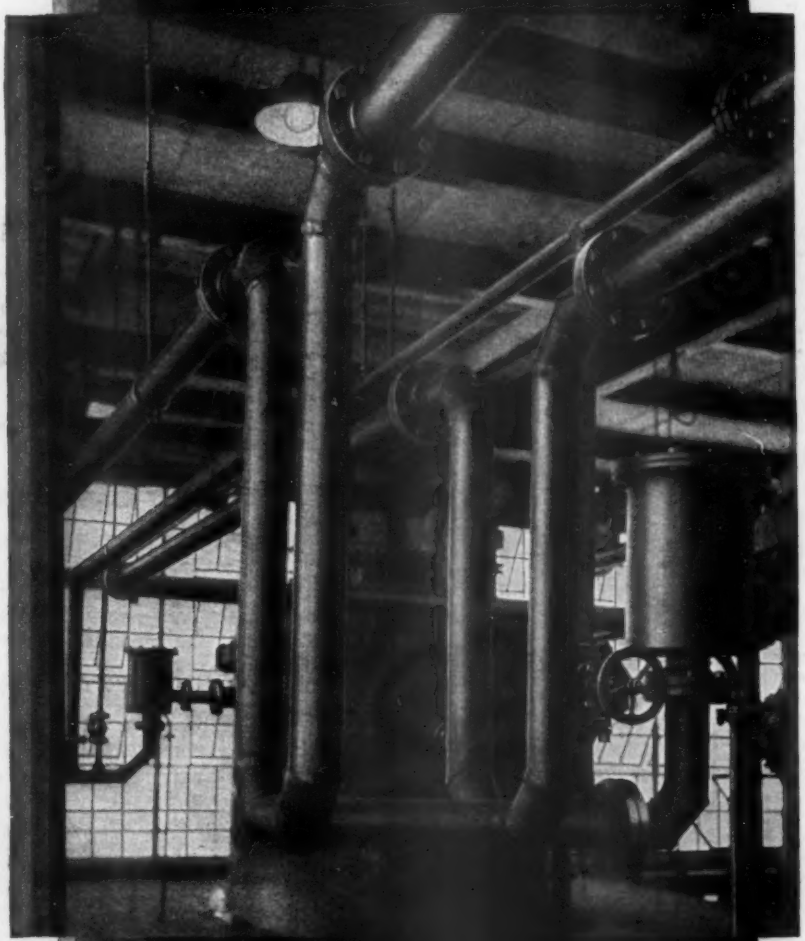
WELDED Industrial Piping



"Proper methods of inspection and procedure control have been established and are available to all interested; so there is no longer any excuse for poor work. Welded lines are often cheaper in first cost, and are invariably superior in the matter of tightness."

—From an Editorial in **POWER**

As pioneers in procedure control welding, we supply industry with the best of everything for oxwelding and cutting.

LINDE OXYGEN
The Linde Air Products Company

Oxweld
Apparatus and Supplies
Oxweld Acetylene Company

Prest-O-Lite
Dissolved Acetylene
The Prest-O-Lite Company, Inc.

UNION CARBIDE
Union Carbide Sales Company

Units of
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Sales offices in
Principal cities throughout the country

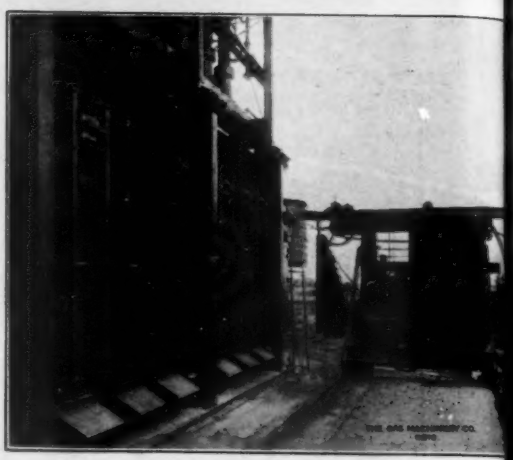
64 Linde plants—45 Prest-O-Lite plants—154 Oxygen Warehouse stocks—138 Acetylene Warehouse stocks—38 Apparatus Warehouse stocks—235 Carbide Warehouse stocks

Complete Gas Plants

WE extend to you a cordial invitation to visit our Booth No. 568-570 at the A. G. A. Convention

Come in and meet us—

You will be very welcome



BY-PRODUCT GAS OVENS

THE above view is the pusher side of a oven. Experience has proved that gas ov produce the best grade of coke commensur with lowest initial investment, minimum of la and lowest cost of maintenance and repairs.

WATER GAS PLANTS

THE view below is a complete water plant recently constructed. It is typical many of our installations. We provide eq ment most adaptable to the needs and requ ments of our clients that will increase the p on the sendout by saving in the cost of prod tion.

PRODUCTS:

Ammonia Sulphate Apparatus; Aqua Amm Apparatus; Gas Works Apparatus; Coal Benches (Silica Retorts); Ammonia Liq Concentrators; Condensers; Napthalene Ext tors; By-Product Gas Ovens; Oil Gas Pla Water Gas Plants; Breeze Collectors for W Gas Stacks; Automatic Controls; Gas Prod ers; Purifiers; Power Driven Pressure Reg tors; Ammonia Scrubbers; Cooling Scrubb Cooling Coils; Tar Stills; Tar Extract Valves; Ammonia Washers; Tar Washers; haust Steam Accumulators; Waste Heat Boil Welded Steel Pipe and Fittings.

The Gas Machinery Com

Special Machinery

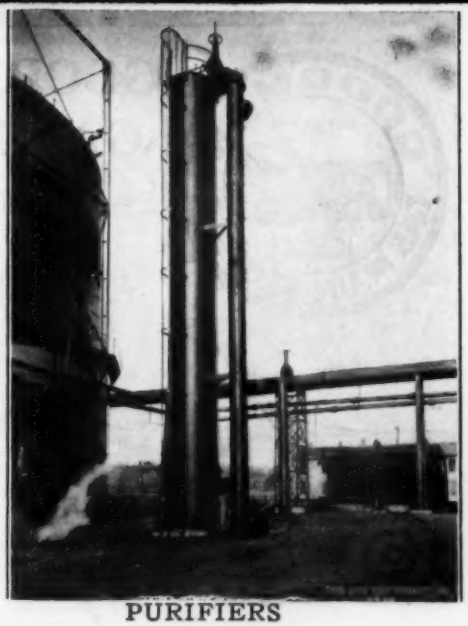
WASTE HEAT BOILER STEAM CURTAIN

This double gate hot gas valve is for carburetted water gas. It is placed between the superheater outlet of a water gas set and the inlet of a waste heat boiler. One waste heat boiler may be used for two or three sets by using one steam curtain valve at the outlet of each superheater and connecting same into a common header leading up to waste heat boiler.

No stack valve is required at outlet of boiler. (Patent allowed.)

COOLING SCRUBBER

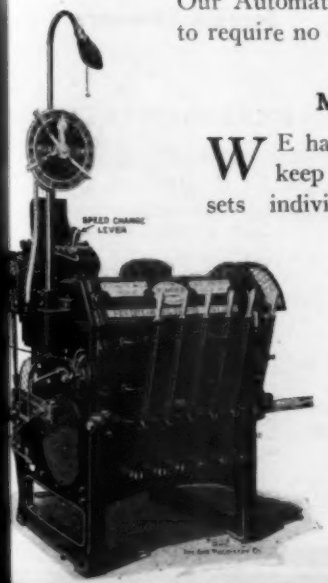
THE cooling scrubber with cooling coils, as illustrated on the right, is installed to cool and scrub carburetted water gas. The cooling liquor is recirculated through the cooling coils, over which cold water is passed. This offers the most efficient type of condensing and scrubbing.



AUTOMATIC WATER GAS CONTROL

(Patented June 10, 1924)

Our Automatic Control is so widely known as to require no detailed description.

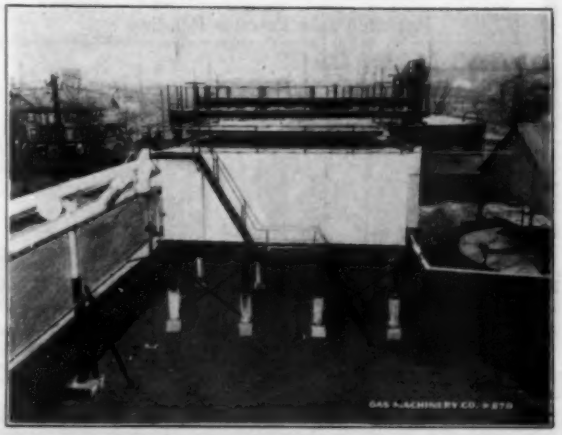


MASTER CONTROL

WE have developed a Master Control to keep "in step" a number of water gas sets individually equipped with automatic controls. The Master Control keeps the individual water gas set operating in a definite relation with the whole. This results in a more uniform mixing of the make gases in the relief holder, also minimizes required capacities of boilers and blowing equipment, and permits the use of smaller connections to the relief holder.

PURIFIERS

THE steel purifying boxes illustrated below are completely fabricated and are welded in the field. Oxide for filling is handled into the boxes by a bucket elevator conveyor which is mounted on the gantry crane used for lifting and transporting covers. The bucket elevator discharges into a screw type conveyor, also carried on the gantry crane and running in a trough provided with discharge gates; by means of this combination the oxide may be discharged into practically any part of the box. Spent oxide is discharged through self-sealing doors in the bottom of the boxes.



pany Cleveland, Ohio.

STREET DE SUPPLIES - PI

GOODMAN *IMPROVED* GAS MAIN STOPPER

Used Since 1897

With improvements added from time to time, now has as its newest feature the "Z" Handle for easier manipulation.

The Locking Sleeve (shown in detail above) holds the Stopper firmly in place.

The new patented cross bar which backs up diaphragm and prevents "bellying" can be used on sizes from 10" upward.

LOOK FOR THE NAME
"GOODMAN"

Fig. 1.

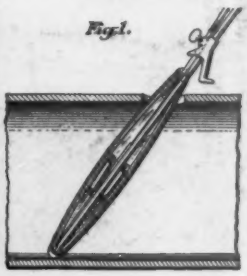


Fig. 2.

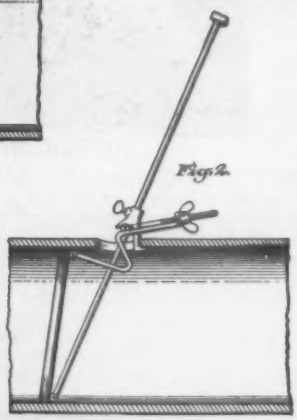


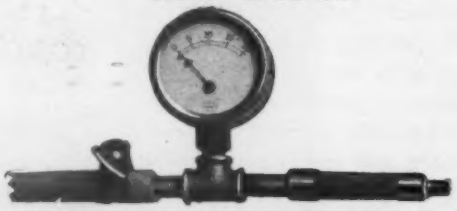
Fig. 3.

Patented and Patents Pending

GAS MAIN BAGS

Type A—Seamless
Type B—Reinforced Seam
Type C—Canvas Covered

GAS BAG VALVE AND GAUGE



This valve keeps the air in while bag is in use. Pull it out and the bag quickly deflates.

The gauge shows accurate internal pressure in bag, which will prove a safeguard against over-inflation.

OTHER PRODUCTS

Air-Line Masks
Bags, Rubber and Canvas-covered
Brushes, Pipe-Cleaning
Expansion Plugs
Joint Runners
Mittens and Gloves
Safety Service Plugs
Soft Wood Plugs
Soap Tape
Binding Tape
"U"-Gauges, portable and stationary
Abbirko High Pressure Service Cleaners

REPRESENTATIVES

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San Francisco, Cal.
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1897
Established 30 Years

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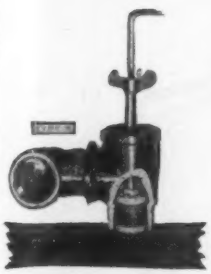
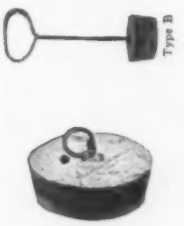
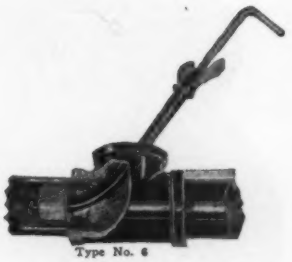
PARTMENT
PE GANG TOOLS

TESTING PLUGS FOR ALL PRESSURES


Type A



Type C


Type No. 6

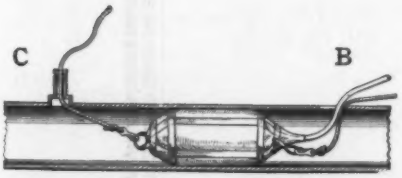
Air Line Mask

With or without Blower. Mask and Blower in separate cases. Blower will supply sufficient air for four masks.

Be Sure To See Our Exhibit BOOTH 730

SOAP TAPE

Safety Gas Main Soap Tape for bandaging broken pipe. Also Binding Tape to cover soap tape bandage



GOODMAN CYLINDRICAL STOPPER
(for intermediate and high pressures)

On intermediate and high pressure gas lines the Stopper is pulled into place and held with cable while being inflated.

OUR METHOD OF INSERTION TAKES LESS THAN A MINUTE

TYPE "C" BAGS

Canvas-covered, for use in mains coated with tar or oil or wherever a plain rubber bag will not hold. The cover is treated to resist the action of tar and oil and this bag IS USED IN OIL LINES while welding is being done. Meets many conditions.

Carried in stock 2″ to 48″. Size 12″ and larger furnished with valves. Valves on smaller sizes, IF SPECIFIED, on order.

FOLD *it and*
WRAP *it and*
DROP *it in* PLACE

OUR PUMP WILL BREAK THE CORD

IN STOPPER CO.
NUE BROOKLYN, N.Y. *Cable Address Gastopper, N.Y.*

1929

There are 2 ways to buy valves—

Either on a basis of price or a basis of quality.

If price is your first consideration you cannot expect unfailing service or long life from your choice. But if you have given values proper thought and bought Darling quality—you can expect—and get the satisfactory performances for which Darlings are noted.

The Darling is a tight seating, easily operated, long wearing valve, built expressly for oil field work. Its best friends are those who have tried it out side by side with other makes and found that a Darling Gate Valve reduced production losses to a minimum, practically eliminated replacements and realized a genuine economy.

Diagrams of construction, showing how and why Darlings operate easily, shut tight, and outlast others, will be gladly sent on request.

DARLING VALVE & MFG. CO.
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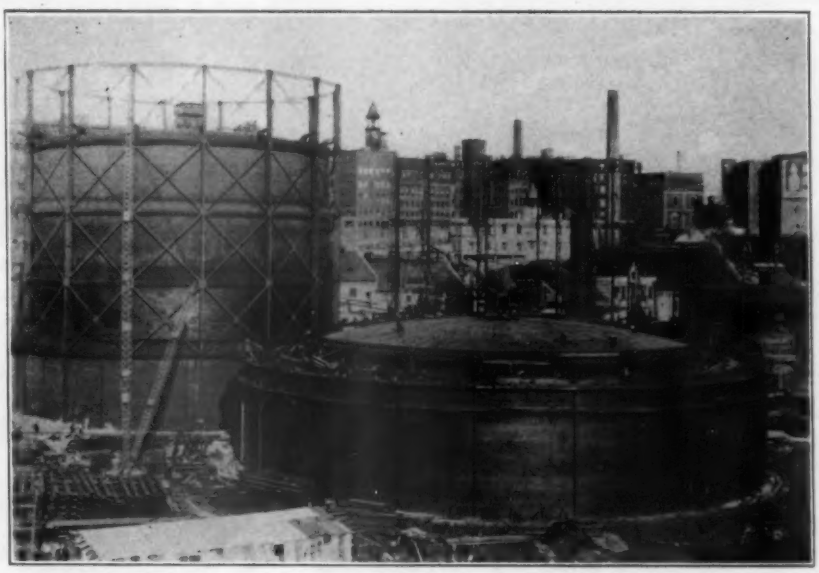
DARLING
GATE VALVES

By Invitation Mem...



New 5,000,000 cubic foot holder (No. 11) of the Rochester Gas & Electric Co., Rochester, N. Y., primed with Ce-Co Suspended Red Lead and finished with Ce-Co Gas Holder Paints. These well known preservative paints are extensively used throughout the gas industry

CE-CO TECHNICAL PAINTS

for Public Utility Companies

Metal Preservative Paints: For all conditions. Special paints for resisting gases, fumes, heat, etc.

Aluminum Paints: Made on several formulae for exterior and interior uses—for resistance to heat, fumes and other conditions.

Power Plant Paints: Protective and decorative paints suitable for all purposes in hydro-electric and steam plants.

CE-CO Gas Holder Paint: All shades, for protection of gas holders. CE-CO Lower Lift Holder Paint, specially quick drying and resistant to cup oils.

CE-CO Fume, Acid and Alkali Resistant Paints: In gray, buff, brown, red, green, etc.

Newlite Interior White: A pure white washable interior paint. Regular and special formulae for ordinary as well as severe conditions of service—dampness, fumes, heat, etc.—on walls, ceilings and trim and other surfaces. May be tinted, if desired.

CE-CO Wall Size-Filler: Fills the pores, stops the suction and offers resistance to free lime and moisture in new plaster walls. For interior use.

CE-CO Dado Enamel: A high lustre, hard enamel finish, in colors, for lower walls, columns and partitions; also for finishing doors, trim and general interior work in industrial plants, offices, etc.

Cecoloid: A quick-drying, hard, durable, and exceedingly attractive enamel. Interior and exterior.

Cement Floor Coatings: CE-CO Cement Floor Enamel, quick drying, in colors; Cement Floor Dressing, transparent; Cement Floor Hardener, Chemical. For surfacing, dust-proofing, decorating and hardening cement floors.

CE-CO Engine Enamel: An oil-proof enamel, in colors, for finishing engines, steam turbines, etc.

CE-CO Pipe Enamel: For preserving exposed pipes in manufacturing plants; also to indicate, by distinguishing colors, the use of each. Made in a variety of attractive shades, also in white and black.

Bituseal Interior Undercoat and Bituseal Exterior Paints: For sealing oil, grease, tar, etc., to prevent staining and permit of white or tinted finishing coats being applied—Newlite Interior White on interior work and CE-CO Utility Paint on exterior work.

No. 795 Underground Pipe Coating: For water, gas and oil lines, etc.

Other Specialties: CE-CO Gas Generator Paint, CE-CO Stack Paints, CE-CO Galvanized Iron Paint, CE-CO Damp-sealer, CE-CO Meter Enamels, CE-CO Canvas Pipe Covering Size-Filler, CE-CO Creosote Sealer, Cecotite Roof Coating, etc.

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The conclusive test of a Water Gas Coal is the "Trial by Fire" in the generators of your own plant.

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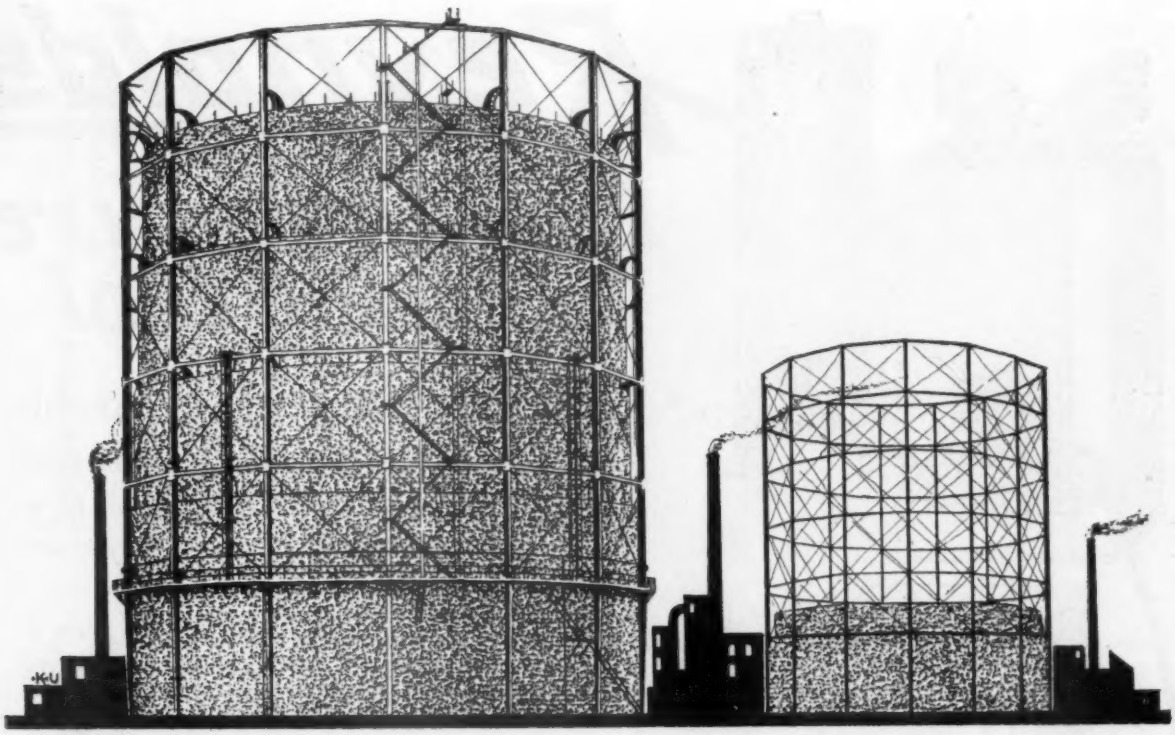

The Convention...

an Invitation and a Reason

When men, deeply interested in the same science, can meet and talk together of the developments of their trade, mutual benefit is the inevitable result.

Sales and purchases may be the eventual outcome, and the meeting can be helpful to all parties for that reason alone. But the great good is the exchange of ideas and practices on a personal, face-to-face basis.

With exchange of thought and fact in view, visit with us at the Cruse-Kemper booth at this month's Convention.

Sincerely,

CRUSE-KEMPER CO.

Gas Holders
Purifiers
Scrubbers
Condensers
Tanks

Ambler, Pa.

Booth Number 673

Pipe
Stacks
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Pressure Tanks
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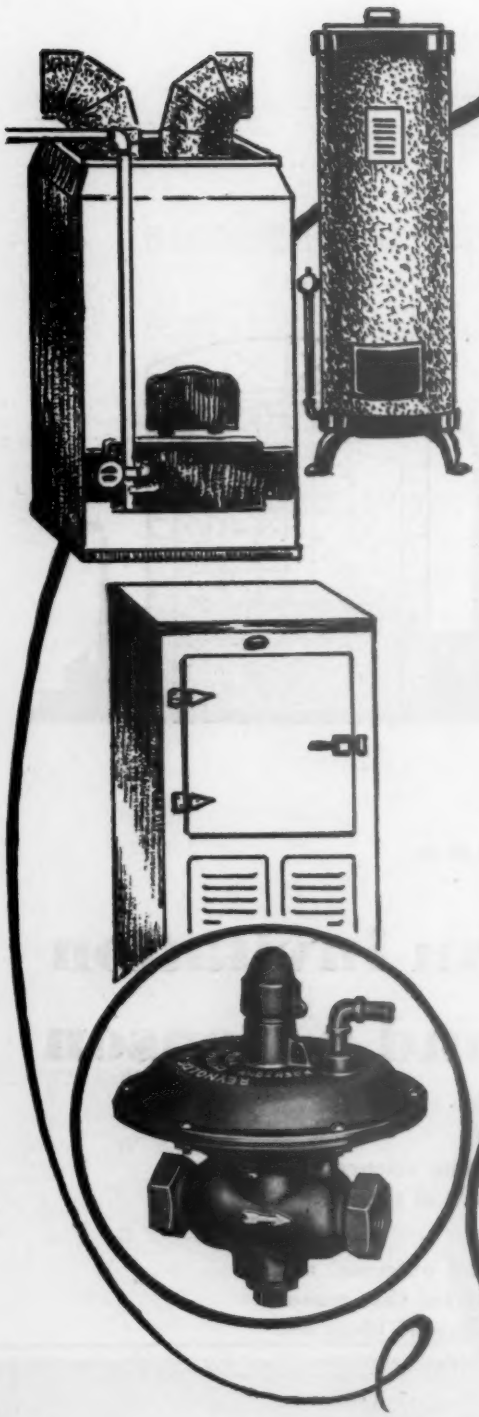

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Low Pressure Gas Control

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A complete line of our Gas Control Units will be on display

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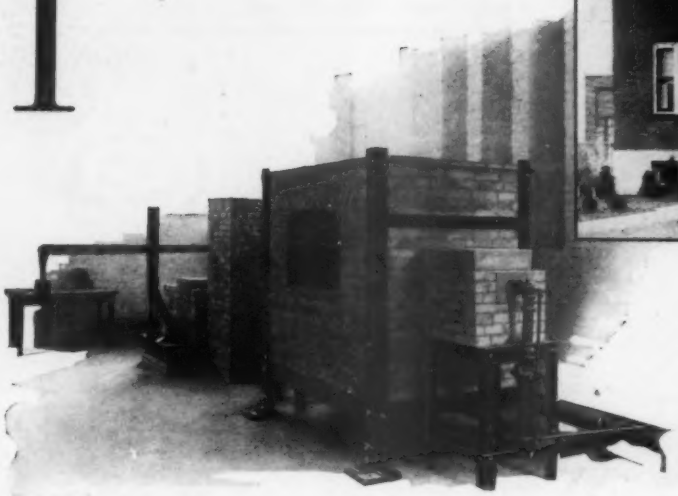

Above is a view of General Refractories Co. Laboratory at Baltimore, Md. At left is view of chemical testing section of the laboratory.

This book gives interesting data on methods employed at the General Refractories Laboratory. A copy will be gladly sent to you on request.

That you can always rely on the high quality and uniformity of General Refractories products is due to

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Methods of mixing, burning, drying, etc., proved most practical from previous laboratory tests.

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Periodic tests reproducing actual operating conditions in the G. R. Laboratory to develop refractories best suited for special individual needs.

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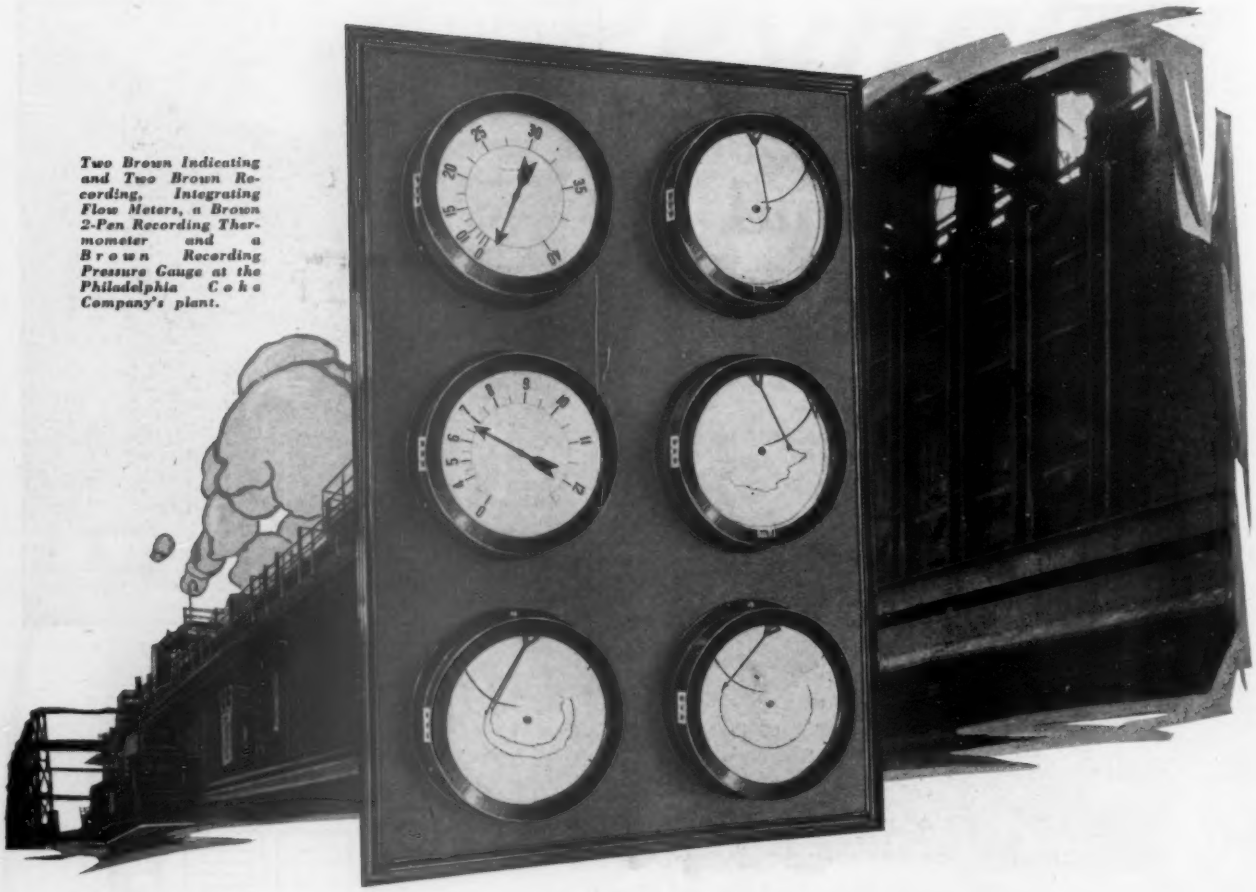

Two Brown Indicating and Two Brown Recording, Integrating Flow Meters, a Brown 2-Pen Recording Thermometer and a Brown Recording Pressure Gauge at the Philadelphia Coke Company's plant.

For efficient operation of coke ovens—

ONE of the most modern coke plants in the country is that of the Philadelphia Coke Company, Philadelphia, Pa., comprising, as it does, the most advanced equipment and plant layout. In accordance with this principle of developing the most progressive practice, this plant has installed a very complete installation of control instruments, a part of which are shown above.

Brown Indicating and Recording Flow Meters at the top of the board measure the amount of producer gas used by the oven. Brown Indicating and Recording Flow Meters in the center of the board show the amount of producer gas used to dilute the fuel gas from the oven. Lower left is a Brown 2-Pen Thermometer showing temperature of stack on coke side, and stack on pusher side of the oven. Lower right is a Brown Recording Pressure Gauge recording gas pressure in the main. Investigate the possibilities of Brown Instruments as an aid to larger operating profits in your plant. Write for Catalogs No. 21 and 65 or ask to see a Brown engineer.

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4473 Wayne Avenue, Philadelphia, Pa.
Branches in 20 principal cities

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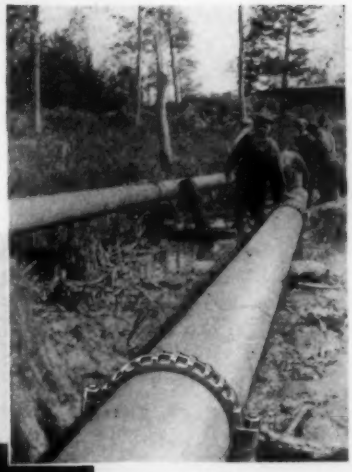
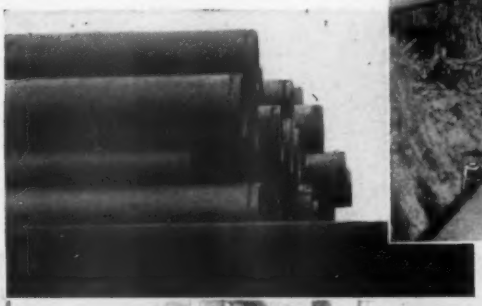
"to measure is to economize"

"FOR EVERY JOINT... ON EVERY LINE"



Grooved Pipe for Victaulic Couplings as easy to ship as plain end pipe.



Train load of 6" pipe, grooved for Victaulic Couplings, South Chester Tube Company, Chester, Pa.

12" oil line with Victaulic Couplings laid over yielding, swampy ground

VICTAULIC COUPLINGS

TWENTY-nine carloads of six inch pipe leaving the South Chester Tube Company, of Chester, Pennsylvania, for the oilfields—a thirty-two mile high pressure oil line—every length grooved for Victaulic Couplings.

In the world's oilfields Victaulic Couplings have earned standardization by the leading oil producing and refining companies for these reasons:

First: Victaulic Couplings provide leak-proof lines for crude oil, gas, water and refined products—lines that stay leak-proof for the life of the pipe—at vacuum and up to all working pressures.

Second: Victaulic Couplings enable lines to be laid faster and at less labor cost, because unskilled, primitive labor can do all the work.

Third: Victaulic Couplings give flexibility at every joint and provide for the contraction and expansion of the lengths of pipe they connect—provide a strain-free line that is not injured by vibration, line sag or even shifting sideways under full working pressure.

Fourth: Victaulic Couplings permit the opening of the line at any joint for repairs or cleaning or for cutting in a branch line—with a minimum interruption of service and without injury to either pipe or coupling.

Fifth: Victaulic Couplings and Fittings are available for all sizes of steel, spiral weld, wrought iron and cast iron pipe in all sizes from ¾ inch up—for any pressure.

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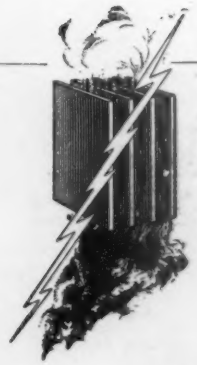

FOR REMOVAL OF TAR AND OIL FROM MANUFACTURED GAS

MORE than 55 installations treating a gas capacity of approximately 900 million cu. ft. per day in plants all over the country and an experience in this special application going back to 1916, prove the outstanding success of Cottrell Electrical Precipitation in solving the problem of detarring manufactured gas such as water gas, coke oven gas and similar gases.

Practically complete removal of tar and oil fog is achieved, with definite attendant advantages of simplified operation and reduced operating costs.

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Carburetted Water Gas Plants

Blue Water Gas Plants

Oil Gas Plants

By-Product Plants

De Brouwer Charging and Discharging Machines

Salt Water and Fresh Water Condensers

Tar Extractors

Purifiers

B. H. Co. Vertical Centrifugal Scrubbers
(Feld Type)

B. H. Co. Thickener
(Genter Type)

Steel Tanks

Vertical Waste Heat Boilers

B. H. Co. Westling Valve
(Patent Applied For)

Fast's Flexible Couplings

GAS HOLDERS

THE BARTLETT HAYWARD COMPANY'S MAIN PLANT

AMERICAN
GAS JOURNAL
Established 1859 Pioneer of the Gas Industry
Including GAS INDUSTRY Est. 1900

HENRY M. RILEY, Editor

Play The Game or Get Out

THE GAS INDUSTRY is not perfect but it seems to be functioning in an altogether healthy manner for a centenarian. As a matter of fact, no business undertaking is perfect. There always exist opportunities for advancement and betterment. Such opportunities constitute the incentive that increasingly stamps any human undertaking a success and when they cease, or when the undertaking attains perfection, just so soon does it end its existence and enters the limbo of failure.

Notwithstanding the great strides made by the Gas Industry in giving the public *almost* perfect service, a fact which many within and without the Industry will enthusiastically acknowledge, there are those benighted individuals who seem to take a pernicious delight in "knocking," "crape hanging," and similar tactics which are generally disastrous for the perpetrator solely.

An old saw that is paraded out now and then is the moth riddled expression, "What the Gas Industry needs is some first class funerals." We do need some first class funerals and happily we get them. But, in this case reference is not made to men but methods. No industry is more alert to discard outgrown ways than our own and we do not have to wait until they are forty years old before administering the chloroform and easing them into a speedy demise. The trouble usually is that many of the "crape hangers" are tardy and bunglesome in aiding with the lethal dose; they are not playing the game.

What is needed in the industry, from top to bottom, is a personnel that will carry on and keep headed goalward. Any one who nurtures an idea that some particular thing is wrong should first assure himself that he has an efficacious remedy before volunteering unwanted lip service. Better still, he should clothe himself with a spirit of progressive unrest and be everlastingly at it investigating every phase of his particular job to see whether it can be bettered or cast aside for an entirely new procedure. Such actions will constitute playing the game at top speed and will earn for the individual advancement of a very tangible sort.

On second thought, perhaps we do need some "first class funerals" of persons also. But the chief figures in these obsequies should most assuredly be those who most vigorously clamor for them. The Industry is by no means forcing malcontents to stay in its ranks; the exit door yawns conveniently for their departure when they are so minded. Indeed, it would seem in order to invite them to either play the game or get out.

Pointed Paragraphs from American Gas Association's Leaders

"Although new avenues of progress are constantly opening for the gas industry, we should not lose sight of the fact that the cultivation of our present lines is still far from complete.

"Aggressive salesmanship is required for the full extension of our traditional services, at least as much as for the introduction of more recent mediums and applications." —*Oscar H. Fogg, President, American Gas Association*

"Our customers constitute an indivisible cross section of The Public. Good relations with this Public make for more and better customers.

"The steady growth and prosperity of our industry indicates, therefore, steadily improving public relations." —*Bernard J. Mullaney, Vice-President, American Gas Association.*

"The industry has learned that in most cases it can train and develop men more satisfactorily than to bring them in from outside. As a result more attention than ever is being given to education activities in all gas companies.

"Committees of the American Gas Association, in co-ordinating their activities with those of universities, colleges and other educational institutions, have been very effective. The special courses now available compare favorably with those in any branch of learning.

"Many companies have undertaken local educational activities and the prospect is hopeful and filled with inspiration." —*C. E. Paige, Treasurer, American Gas Association.*

"The social and economic changes which characterize American domestic and industrial life make most necessary the continuation of the close study and research work which the American Gas Association has been conducting for the industry

"To keep in advance of these changes, as is always our aim, we are hopeful of having the utmost cooperation from our member companies in the way of information bearing on the growth and trends of their various classes of sales or market outlets." —*Alexander Forward, Managing Director, American Gas Association.*

Customer Habits and Utilization Trends

As the Journal Views the Domestic Load Problem

THE COOKING LOAD Gasmen generally, sense the fact that the use of gas for cooking in the home is gradually tapering off. On the other hand, opinion is somewhat divided as to what steps should be taken in dealing with the matter. In the aggregate there are two schools of thought relative to the problem. The first, which is by far the larger of the two, at least from the standpoint of outspokenness, holds that through persistent and widespread publicity the housewife can be shown the error of her ways, so to speak, and can be won back to where she will buy but very little all or partly-cooked foods.

A second group which for the moment is merely indulging in thinking, might counsel a recognition of a fast growing habit and push gas for other uses in the home.

It cannot be denied that the trend is out of the kitchen, and for that matter, out of the home itself. The call of the movies, the bridge club, the golf course, the open road and a myriad others is being answered and to take up the cooking slack ready prepared food is resorted to.

SIGNIFICANT FIGURES A glance at the figures showing the strides made in the canning industry is enlightening, even if disconcerting. From 1909 to 1927 canned fruits and vegetables increased in value from ninety-one millions of dollars to five hundred and fifty-three millions; fish and oysters, from twenty-eight millions to sixty-four millions; meats, from fifteen millions to twenty-eight millions. It is obvious that the country's increase in population will not even start to explain away the trend.

One might argue that it is not right for women to forsake the old ways of preparing the meal. In turn one might also reason that the back yard or community pump should still be in operation, that phones should not be used, that aeroplanes are too fast, that adding machines are not needed, that key winding watches should still be in vogue, etc., etc. In all the so-called improvements littering the pathway of civilization there seem to predominate two ideas, one to make living easier and the other to save time. It is futile to speculate as to the use we are going to make of all the leisure time gained, the urge is ever present and it lacks for no devotees. The Gas Industry itself is an ardent advocate of time saving and making living easier and more convenient.

THE GAS RANGE'S FUTURE Granting for the moment that the trend is toward pre-cooked foods, several queries might be propounded. Among these are: will the gas range disappear from the kitchen, and; how will range sales be affected?

The gas range, it is felt, will still be a necessary appliance. It will be used for certain phases of cooking, heating the pre-cooked foods, boiling small quantities of water in emergencies and similar uses. Moreover, it is highly likely that competition from the electric range will be lessened. Indeed, the trend would seem to be more damaging to the chances of the electric range than to the gas unit.

Range sales might be kept at the desired point by a change in styles and a trend to lower prices by way of mass production.

EFFECT ON OTHER APPLIANCES If the trend in question persists there would seem to be less use for the incinerator and gas refrigerator. It is likely that the use for these appliances would be less but still they would be indispensable. There would still be milk, butter and left-over food to be preserved; ices to be frozen and ice cubes to be available for the table, the sick room and other necessary uses. There would still be ample accumulation of litter, refuse and the like to be disposed of in the incinerator.

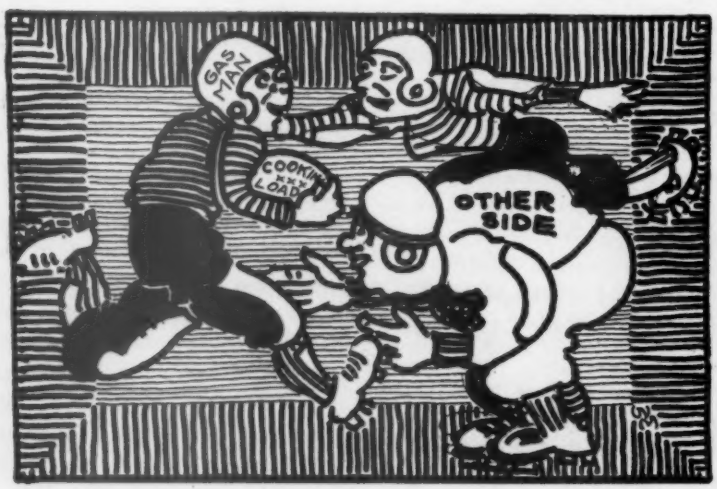
The Home Service Department would still be a necessary phase of gas company activities. Advice would still be needed as to balanced meals and there would still be the need for guidance in various matters pertaining to the proper and efficient management of the home. The use of gas heated hot water as a matter of hygiene in the home still yearns to be taken under the wing of Home Service activities and as gas finds universal use

in heating the home and otherwise, the Home Service Department can legitimately enter the field of giving home decorating counsel.

FILLING THE BREACH If the cooking load continues to show a decrease gas men obviously will have to bolster up the loss in other directions. When we consider that it takes about as much gas for the ordinary person's bath as to prepare a meal for the whole family matters look far from blue. Further, it is generally known where we are headed in the matter of a bath room for every bed room. Extravagant America seems now almost to demand this extreme.

What does this mean? Obviously, unless the Gas Industry prefers to slumber on its job, it means more, not less, household use of gas.

Even without the gas refrigerator, incinerator, fire place heater, or other devices of a truly modern home, we can, if we will, have a growing home load, and on a fair basis of non-seasonal business, too.



Will our side keep the ball?

household, a relatively few large industrial uses which are also non-seasonal, and then the great multitude of seasonal loads, some of which come at times of peak and some of which, fortunately come at other seasons of the year. On top of this combination, which gives about a 50 per cent load factor for the year's business, it is proposed to add house-heating which certainly has a capacity load factor not greater than 25 or 30 per cent, and often worse than this. It is not past belief that this house-heating load may in the aggregate more than equal the present peak load of communities that do not have much industrial business. As a consequence, the capacity load factor of the entire system would be very greatly reduced, possibly dropping to 35 or 40 per cent for our assumed typical city. That means that the average capital charge on every thousand feet of gas is going to increase correspondingly. *The gas industry cannot allow that result to come to pass!* It must do something to maintain at least the present capacity load factors and it should do anything in its power to raise them.

GAS HOUSE HEATING The same conclusion is not true with regard to house heating. Yes, we often groan about those cold-wave peaks of gas demand that we see ahead. But we prefer to something about them, because oppose them all you will, they are going to come. We will have to do househeating business, regardless of our preference. It is better, then, that we take it on terms in the making of which we of the industry have had some part. Better not to sit still and have both bad load curves and also the other fellow's terms forced on us. Let the industry set up the conditions as far as it may for its own good. But how?

There are a multitude of little factors that can be done to aid in adjusting the new house-heating load to the gas works and gas-distribution system. None of these are, however, anything like as effective as an effort which has in itself nothing to do with house heating. We refer particularly to the getting of industrial non-seasonal business. Let us take a specific hypothetical example of what this relationship really means. At the present time the typical city requirements for gas are made up of many small non-seasonal uses of the

THE WAY OUT The one hope of success in this direction lies in the development of more industrial gas business. To get such business the Industry has got to sell heat. More heat, and Still More Heat.

It is not particularly necessary to sell service, or cleanliness, or any of the rest of the admitted advantages of gas. The real job is to sell heat, the only thing on which the gas industry has no genuinely successful competitor.

From these facts it is evident why American Gas Journal concludes that the solution of the house-heating problem does not lie so much in the house nor in the furnace design. It lies in the industrial plant where the non-seasonal loads are to be found that will make economically possible continuing of the gas business with large highly seasonal house heating added.

This generalization is easily set forth. It is probably generally acceptable. But the getting of the industrial business is less easy and the certainty of getting it less generally believed in. However the individual may feel about the matter, he might as well admit the fact that unless he gets for his company a million cu. ft. of in-

dustrial sales every time that he has to accept a million cu. ft. of house-heating business, then he is slipping backward. House-heating business unaccompanied by industrial non-seasonal loads is a mill stone that will drag into economical oblivion any industry that is already as heavily saddled with capital charges as the city-gas business.

RATES INFLUENCE We need in the gas business in order to get industrial customers more sliding-scale rates. We may get house-heating sales, even though we do not want them at $1.25 per thousand feet. Luxury-loving Americans will buy the convenience of gas heating even at that extravagant price. But Mr. Industrial Plant Manager cannot and will not sign a contract for gas on such an absurd flat-rate basis. We have got to take into account his seasonal load factor. We have got to give him a rate which will permit him to use gas economically because it gives him the heat which he wants in a convenient form ready for efficient use at a cost not materially greater than can be offered by any other equally applicable heat source.

American gas men have accepted these ideas in their convention discussion, but their acceptance back at home and their *fight* for them with state and municipal authorities has been half-hearted. Any gas company which does not have a suitable sliding scale of rates permitting it to get industrial business probably has no one but itself to blame. The public can and will be sold on the quality of the general community benefit that comes from such rates—provided the management has the determination and the intelligence to do its part of the job. We believe that such industrial effort is not only vital for the general advancement of the commercial business of the company. It is even more essential as a factor in maintaining load factors in the face of increasing space-heating business.

OTHER CONSIDERATIONS IF, as the present trend would indicate, there will be a continuing decrease in the domestic load for some time to come the Industry should see to it that the following prospects are adequately and completely brought into the fold.

Restaurant and hotel business.

Cannery business

Meat packing business

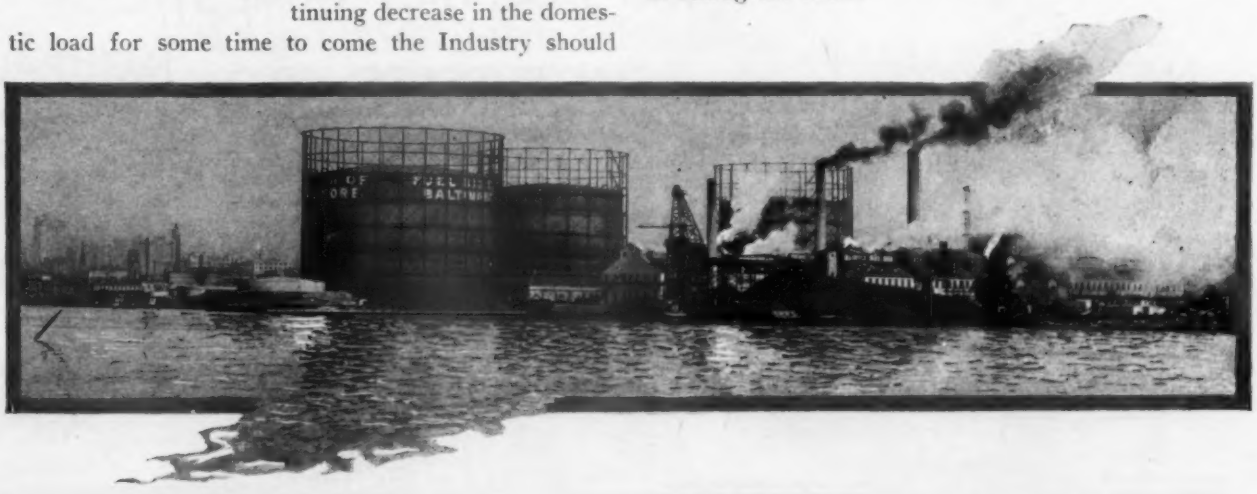
Prepared cereal business

These are the places from which are delivered those ready cooked foods that are tending to make the household range largely a warming-up device, not really a cooker.

And right here we pause to raise some queries as to whether the Gas Appliance Manager has perhaps overlooked the fact that even the seldom-used kitchenette must have some warming-up appliance. Is he sure in his town that it is a *gas* appliance? Has he forgotten that it is worth while to sell many appliances, even those which use but little gas so that his costs of selling can be cut down *per stove* sold? When we listen to convention orations on commercial management, we often wonder about these points. We even wonder whether it might not be better to have him told to sell gas appliances just as if he were not interested at all in the sale of gas. Perhaps he'd then sell more appliances than now, and conceivably even more gas by the new point of view he'd take.

The Industry must, if possible, get closer to the architect and the same applies to the appliance manufacturer. The matter of insulated homes demands painstaking study. In this connection we must not only push insulation for new homes but we must study out some scheme for adequately and inexpensively insulating old homes. We must exercise the initiative in the matter because it is patent that there is at present no strong reason why the architect should go out of his way inducing house owners to insulate old homes.

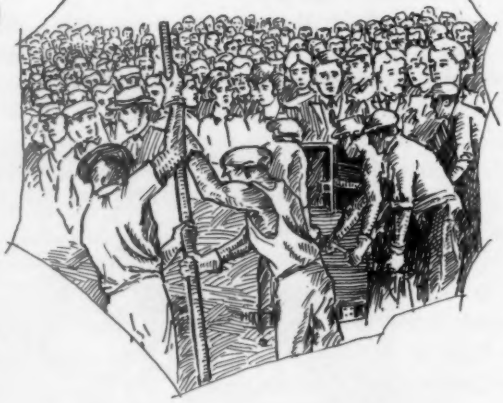
The appliance manufacturer should pay close attention to making ranges attractive and, if need be, ultra modern. The trend is that way and the architect will certainly be obligated to them if a "snappy" range helps in selling the home.



The Scope of a M

CAPITAL INVESTED
$3,000,000,000

TOTAL EMPLOYEES
93,800

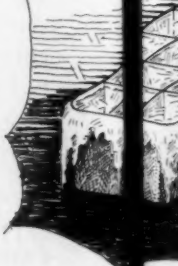


MILES
10

CUSTOMERS
11,841,000

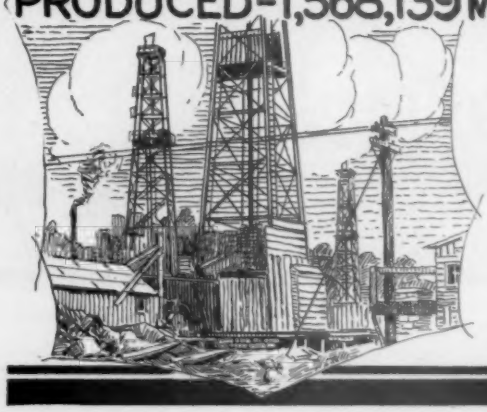
NATURAL GAS
DOMESTIC CUSTOMERS
4,366,000

REFR
6



NATURAL GAS - DOMESTIC
Average Value at Points of Consumption
per M·C·F·(CENTS) 62·0

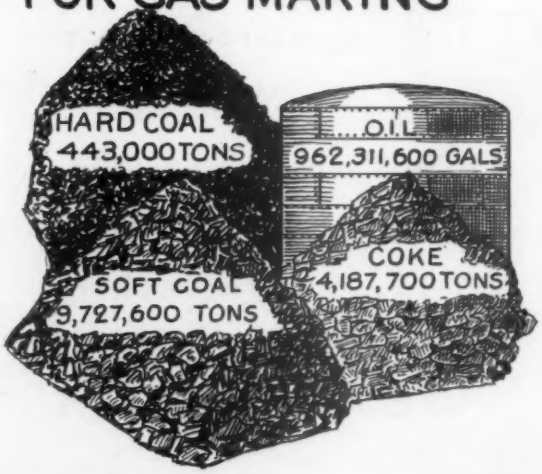
NATURAL GAS
PRODUCED - 1,568,139 MILLIONS OF CU. FT.



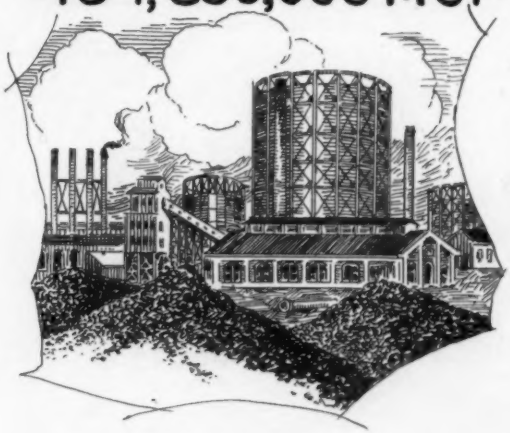
NATURAL GAS
Average Value at
$,102

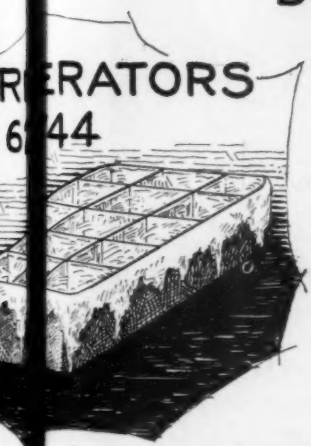
ghty Industry

RAW MATERIALS
FOR GAS MAKING

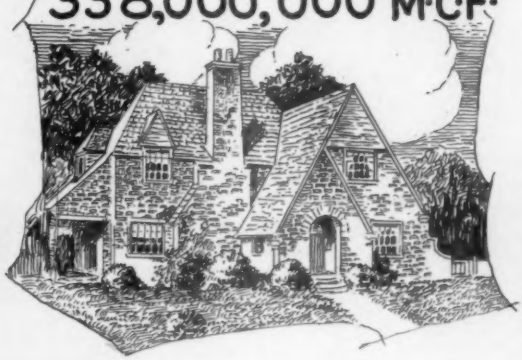


M·C·F· SOLD-
494,830,000 M·C·F·



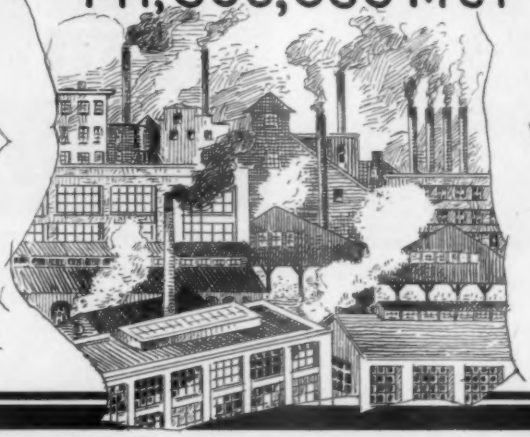


DOMESTIC USE OF GAS
338,000,000 M·C·F·



NATURAL GAS
DOMESTIC USE
320,877 MILLIONS OF CU.FT.

INDUSTRIAL USE OF GAS
147,000,000 M·C·F·

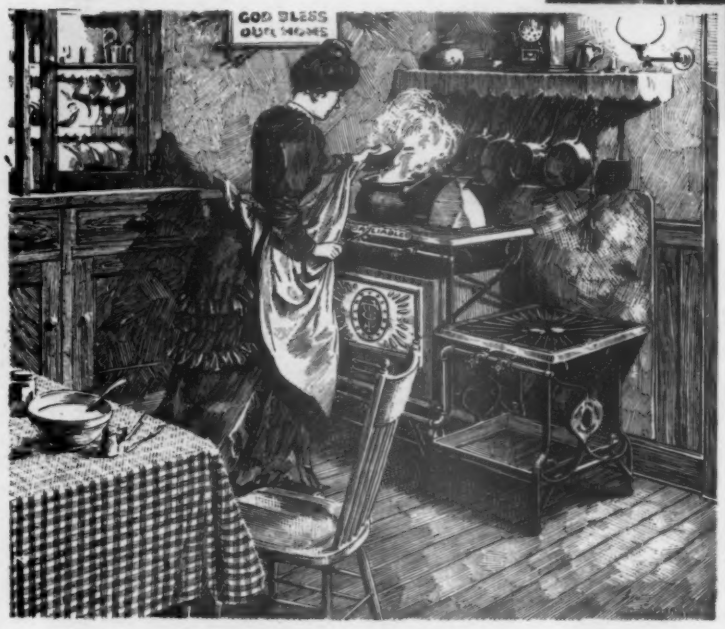


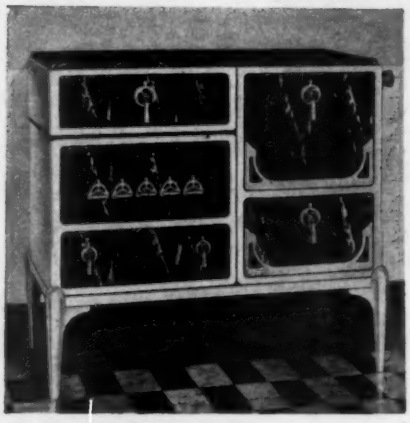
NATURAL GAS
INDUSTRIAL USE
383,317 MILLIONS OF CU.FT.

Up the Centuries From Fireplace Cooking

A Pictorial Narrative of the means employed through the ages for satisfying man's most impelling craving—hunger

Above—Primitive fireplace method of cooking. Right—The coal and wood stove which added convenience but did not abolish dirt. Below—Early ancestor of the modern gas range; vintage of 1890. Lower right—One of the present day gas range models.





Illustrations courtesy American Stove Company

Charm and Livability in the Kitchen

THROUGH the courtesy of Associated Tile Manufacturers, New York City, there is reproduced above a kitchen that cannot fail to intrigue a great number of progressive Home Service Directors.

This delightful kitchen, designed by Ludlow and Peabody, one of America's leading architectural firms, with its gay tiling on floor and walls and its built-in gas range, is worthy of careful study on the part of the Gas Industry, to the end that the kitchen ultimately may be made the most attractive room in the home. Particular attention is called to the recessed hood and its unobtrusiveness.

It is refreshing to note that this distinguished firm of architects has recognized the worth and stability of the gas range by way of including it prominently in their design. Such procedure belies the old idea that architects consider gas cooking passé.

This design, which first made its appearance in various publications as of October, 1929, would seem to go hand in hand with an editorial "Gas Range Possibilities,"

which ran in August, 1929, issue of *American Gas Journal*. In this connection it is deemed worth while to repeat the editorial in question.

"Gas Range Possibilities"

Editorial reprinted from August, 1929, issue, American Gas Journal

"Compared with its status twenty years ago, home architecture in this country seems to be following more logical lines; that is, home architecture which is concerned with that type and price of house that offers an immediate field for the 'all gas home.' Gone are the scroll saw abominations of former years and the uninviting square or box type of houses which followed in their wake.

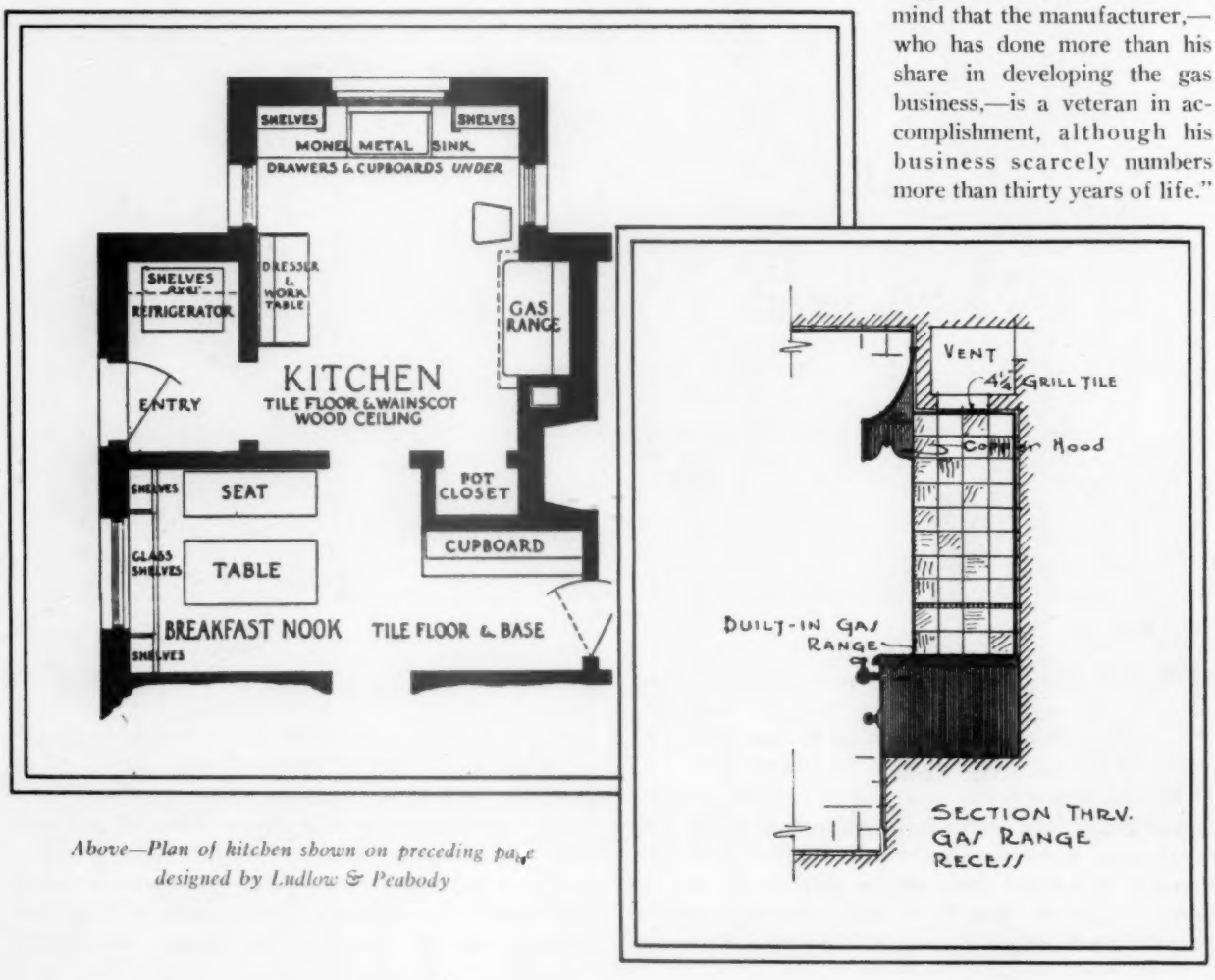
"Despite the strenuous efforts to introduce the modernistic home, it is likely that we will adhere closely to the English, American Colonial, Spanish and other proven types of home architecture. These have weathered the test of time and have measured up to the requirements of beauty and livability.

"Coincident with this development has come a painstaking study of the correct furnishing and interior decoration of the home. And, what with the widespread and easily obtainable literature and information on the subject, the veriest tyro can keep posted as to the proper decorative scheme.

"Gas men are giving enthusiastic attention to the beautification of the home in so far as their appliances enter into the scheme of affairs. Thus, for example, the customer can be accurately advised as to the proper type of gas fire-place heater to harmonize with a particular style of home architecture and interior decoration. In this connection, the appliance manufacturer has intelligently worked out the correct design without the least sacrifice in utility.

"An architect acquaintance recently raised the question as to why the gas range could not be made to follow a certain architectural scheme. To be specific, he assumed a home of Dutch architecture. Then he speculated on the feasibility of a gas range being built into the kitchen. Such a range would be resplendent with tiling and would simulate, in a sense, a Dutch oven. For other types of architecture a similar course could be pursued.

"Offhand, it would seem that the suggestion might have possibilities and, indeed, might greatly assist in the sale of a house. From the standpoint of the range manufacturer there might be serious obstacles in the way of carrying out the project. However, stranger things have happened, when one calls to mind that the manufacturer,—who has done more than his share in developing the gas business,—is a veteran in accomplishment, although his business scarcely numbers more than thirty years of life."



Above—Plan of kitchen shown on preceding page designed by Ludlow & Peabody

Cracking of Oil in the Water Gas Machine

By Wilbert J. Huff
Professor of Gas Engineering, Johns Hopkins University

SOME knowledge of the progress of the reactions which permit the conversion of high molecular weight oils into hydrocarbons of lower molecular weight and hydrogen is of considerable importance to the maker of carburetted water gas, for it is upon these reactions that the water gas maker must depend in order to obtain a finished gas of a thermal value sufficiently high to meet the regulations under which he is operating. Since from about 2/5th to ½ of the thermal value of the finished gas is contributed by oil cracking the quantity of oil cracked must necessarily be large and the considerations involved are of considerable importance.

To the gas maker the chief objective is to secure a stable oil gas, that is, a mixture of hydrocarbons and hydrogen that does not condense in mixture with blue gas when cooled to the low temperatures which may be encountered in the distributing mains. This requirement is further conditioned by the fact that if the oil is overcracked a considerable loss in heating value may occur due to the deposition of carbon on the checker-brick and if the oil is undercracked the incomplete treatment permits the presence of an unduly large amount of resin-forming compounds which may later polymerize in the distributing systems, causing stoppages and gum troubles.

Wilbert J. Huff

Oil Cracking an Old Art

To understand the course of rearrangement through which the hydrocarbons may go in the process of cracking it is necessary to review a very extensive literature. The cracking of oil is an old art, dating prior to any knowledge of the chemical composition of the oil or of its cracked products. The manufacture of illuminating gas from oil was discussed in England as early as 1792 and there is a record of a study of hydrocarbon gas by Dalton in 1809. Faraday in 1825 discovered benzine. The first extensive study is that by Berthelot who published his results from 1863 to 1869.

The importance of the subject of the pyrogenetic decomposition of oils in the manufacture of gas has stimulated these studies. Since this incentive has directed the attention to investigations of simple low molecular weight hydrocarbons such as methane, ethane, ethylene, and acetylene, information concerning these is available but much less is known about the cracking reactions of the higher molecular weight hydrocarbons of the naphthene and paraffin type.

The whole field of investigation is a rather complex one and the reactions which go on are so many and so varied and so incomplete that it is very hard to establish many valid scientific generalizations. Berthelot attempted to generalize and so formulated a theory which held that the cracking first led to the decomposition of the higher molecular weight hydrocarbons with the formation of low molecular weight hydrocarbons and the synthesis of other high molecular weight hydrocarbons from those which had low molecular weights. He held acetylene to be an important material in these changes.

These conclusions have not been substantiated by later investigations.

Generalizations

A generalization of the available information and extensive résumé of the reactions was attempted by Leslie in his doctor's dissertion at Columbia University in 1916, and Dunstan and Thole in 1916 also published a résumé of these reactions.

Considerable space is given to bibliographic résumés of cracking by Leslie in his book and by Gruse in his more recent work. It is beyond the scope of of this present paper to deal with the subject of cracking in so extensive a manner as these authors have and the reader is therefore referred to their works for additional information.

Following are some of the generalizations which apply to the primary reactions under vapor phase cracking conditions.

Paraffins: It appears that high molecular weight hydrocarbons in cracking yield first a long chain olefin and a low molecular weight paraffin. One noteworthy feature which is developed by many investigators is the fact that the percentage of olefins obtained is always much higher than the percentage of paraffins of the same number of carbon atoms. There appears to be a group of maximum stability in the paraffin hydrocarbons having from 12 to 15 carbon atoms. This point is not conclusively established but the evidence appears to indicate that paraffin hydrocarbons of somewhat more or somewhat less number of carbon atoms are less stable, those of higher molecular weight being notably less stable.

Cyclic hydrocarbons other than aromatics: The important common cyclic-hydrocarbons, other than aromatics, are the naphthenes and the polymethylenes. Knowledge at present available on the thermal reactions of materials of this class is so limited that it is difficult to summarize it into broad generalizations. In general 5 and 6 member rings are the more stable. Cyclic base petroleum lose hydrogen rapidly when heated at temperatures over 600° C. but give large quantities of aromatics such as benzene, toluene, and xylenes. In addi-

tion to aromatics, paraffins and olefins are formed by the thermal decomposition, but very little is known of the exact nature of these rearrangements.

Secondary reactions: Important secondary reactions must occur during all cracking processes. In the case of unsaturated compounds such as olefines, it is possible that these secondary reactions may lead to polymerization or condensation of olefines into polymer compounds of two, three, or four simple olefines. This condensation, however, is probably not of great consequence during the gas making period. The secondary reactions of importance here probably are further decomposition and dissociation.

Simple Hydrocarbon Reactions

Reactions of simple hydrocarbons, methane: Methane is exceedingly stable up to temperatures of as high as 1200° C. and is almost invariably found in all cracking reactions. The stability has been studied extensively by Bone and Coward. These workers found that methane was entirely stable at 700° C. and decomposition did not become of much importance below 900° C. At the end of half an hour at a temperature of 985° C. the gaseous reaction mixture contained about 63% methane. The products were chiefly carbon and hydrogen, only traces of acetylene and unsaturated hydrocarbons being found at the temperatures studied which were below 1200° C. Pring and Fairlie have shown that at 1300° C. there is some formation of ethylene and acetylene appears in the decomposition products at temperatures of 1650° C. It may be said, therefore, that for the gas maker the only reaction of importance is its decomposition into carbon and hydrogen.

Ethane: Ethane has been studied by Bone and Coward, who find that the decomposition is very rapid at relatively low temperatures when compared with methane. Thus at 800° C. in one minute's time the gas mixture contains almost 2% of acetylene, about 11% of ethylene, about 18% ethane, about 30% methane and about 37% hydrogen. After heating one hour at this temperature only methane and hydrogen remain.

Ethylene: Ethylene is one of the important gases in oil cracking. It is always found in considerable quantity when the higher paraffins or naphthenes are decomposed. Bone and Coward find that this gas undergoes considerable change at temperatures of from 570 to 580° C., yielding acetylene, ethane, methane, hydrogen and aromatic hydrocarbons. At the higher temperatures such as 950° C. large quantities of carbon separate. At 800° C. it appears that the ethylene gives methane and acetylene as its chief products and dissociation into acetylene and hydrogen is one of the most important reactions of ethylene. There is also some evidence to indicate that ethylene forms directly cyclic hydrocarbons of the napthene type.

Aromatic hydrocarbons: Aromatic hydrocarbons can be formed from acetylene very readily. At one time it was thought that this was the chief mode for the formation of aromatic hydrocarbons in cracking pracesses. From the evidence now obtainable it appears that acetylene plays a very small part, if any, in this formation. An important mode of formation involves the dehydrogenation of the naphthenes.

Side chain aromatics break off their side chains first. Thus xylene gives toluene, benzene, naphthalene and anthracene. Benzene gives naphthalene and anthracene. Other derivatives such as diphenyl and the methyl naphthalenes and anthracenes are found in smaller amounts.

Other investigations have shown that benzene gave considerable amounts of diphenyl and diphenyl derivatives, the most favorable temperature for the formation of diphenyl being about 750° C.

The usually expected order of the decomposition of the aromatic hydrocarbons follows that suggested by Egloff and Twomey. This is as follows: "Higher homologues → xylenes → toluene → benzene → naphthalene → anthracene → carbon and hydrogen."

Effect of Gaseous Atmospheres: The effect of nitrogen and hydrogen atmospheres respectively upon the decomposition of ethane at high temperatures has been studied by Bone and Coward. At 800° C. for one hour in nitrogen the ethane was completely broken down, the products being methane, carbon and hydrogen. When the hydrogen atmosphere was used 80% of the carbon content of the ethane appeared as methane. This is 2.27 times as much as was obtained when the nitrogen atmosphere was used.

The same authors also studied the effect of nitrogen and of hydrogen upon ethylene. In this case there was 3.15 times as much methane in the hydrogen mixture as in the nitrogen mixture.

Investigations by Hempel and by Whitaker and Rittman have shown that the amount of gas formed in oil cracking is increased when the cracking takes place in the presence of hydrogen. The separation of carbon is decreased and the quality of the tars is changed.

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mospheres and with blue gas led to the conclusion that no advantage was to be gained by substituting any of these other atmospheres for blue gas. Blue gas, when used, gave much better candle power results than either hydrogen or carbon monoxide. The tar formation is lowered and the carbon depositions are medium. The B.t.u. results are greater than those obtained in any other single atmosphere.

Since steam is always present in the blue gas the effect of this upon the cracking is of some interest. Steam gave lower yields of tar and larger carbon depositions. It also allowed the maximum illuminants to occur at slightly higher temperatures due probably to the blanketing effect. From a B.t.u. standpoint the presence of steam is not objectionable but the steam does reduce the candle power and candle per gallon results, so from a photometric standpoint the presence of steam while the oil is being cracked is undesirable.

Tar from the Oil

The primary condensates from cracking are, of course, found as tar. The composition of this depends in part upon the temperature at which the carburetter and superheater are maintained. At the higher temperatures the tars are aromatic in their nature and are somewhat heavy and, at times, somewhat viscous and contain some free carbon. If the temperature of the checkerbrick be maintained low, that is below 1300°, the tars are much lighter and contain hydrocarbons of the aliphatic type. Recent practice is favoring the use of the higher temperatures in the cracking process.

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$C_nH_{2n} + 2 = C_n - 1\ H_{2n} - 2 + CH_4$
Paraffine = Olefine + Paraffine
$C_n - 1\ H_{2n} - 2 + H_2 = C_n - 1\ H_{2n}$
Olefine + Hydrogen = Paraffine
$C_n - 1\ H_{2n} = C_n - 2\ H_{2n} - 4 + CH_4$
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They present charts illustrating the effect of time of contact and temperature upon the decomposition of gas oil. An examination of these charts shows that the methane, expressed in cubic feet per gallon of oil increases when the time of contact is increased and when the temperature is increased. The amount of illuminants passes through the maximum at a temperature between 1300 and 1350°F. and decreases with increasing time of contact. There is absorption of hydrogen which absorption increases as the temperature is increased and as the time of contact increases. Ethane passes thru a maximum, the maximum being found at a temperature of about 1350°F.

Odell and Dunkley Findings

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The above conclusions apply, in general, to temperatures up to 1,600°F., which is about the upper limit of the experiments made, so far as data are available.

tion to aromatics, paraffins and olefins are formed by the thermal decomposition, but very little is known of the exact nature of these rearrangements.

Secondary reactions: Important secondary reactions must occur during all cracking processes. In the case of unsaturated compounds such as olefines, it is possible that these secondary reactions may lead to polymerization or condensation of olefines into polymer compounds of two, three, or four simple olefines. This condensation, however, is probably not of great consequence during the gas making period. The secondary reactions of importance here probably are further decomposition and dissociation.

Simple Hydrocarbon Reactions

Reactions of simple hydrocarbons, methane: Methane is exceedingly stable up to temperatures of as high as 1200° C. and is almost invariably found in all cracking reactions. The stability has been studied extensively by Bone and Coward. These workers found that methane was entirely stable at 700° C. and decomposition did not become of much importance below 900° C. At the end of half an hour at a temperature of 985° C. the gaseous reaction mixture contained about 63% methane. The products were chiefly carbon and hydrogen, only traces of acetylene and unsaturated hydrocarbons being found at the temperatures studied which were below 1200° C. Pring and Fairlie have shown that at 1300° C. there is some formation of ethylene and acetylene appears in the decomposition products at temperatures of 1650° C. It may be said, therefore, that for the gas maker the only reaction of importance is its decomposition into carbon and hydrogen.

Ethane: Ethane has been studied by Bone and Coward, who find that the decomposition is very rapid at relatively low temperatures when compared with methane. Thus at 800° C. in one minute's time the gas mixture contains almost 2% of acetylene, about 11% of ethylene, about 18% ethane, about 30% methane and about 37% hydrogen. After heating one hour at this temperature only methane and hydrogen remain.

Ethylene: Ethylene is one of the important gases in oil cracking. It is always found in considerable quantity when the higher paraffins or naphthenes are decomposed. Bone and Coward find that this gas undergoes considerable change at temperatures of from 570 to 580° C., yielding acetylene, ethane, methane, hydrogen and aromatic hydrocarbons. At the higher temperatures such as 950° C. large quantities of carbon separate. At 800° C. it appears that the ethylene gives methane and acetylene as its chief products and dissociation into acetylene and hydrogen is one of the most important reactions of ethylene. There is also some evidence to indicate that ethylene forms directly cyclic hydrocarbons of the napthene type.

Aromatic hydrocarbons: Aromatic hydrocarbons can be formed from acetylene very readily. At one time it was thought that this was the chief mode for the formation of aromatic hydrocarbons in cracking pracesses. From the evidence now obtainable it appears that acetylene plays a very small part, if any, in this formation. An important mode of formation involves the dehydrogenation of the naphthenes.

Side chain aromatics break off their side chains first. Thus xylene gives toluene, benzene, naphthalene and anthracene. Benzene gives naphthalene and anthracene. Other derivatives such as diphenyl and the methyl naphthalenes and anthracenes are found in smaller amounts.

Other investigations have shown that benzene gave considerable amounts of diphenyl and diphenyl derivatives, the most favorable temperature for the formation of diphenyl being about 750° C.

The usually expected order of the decomposition of the aromatic hydrocarbons follows that suggested by Egloff and Twomey. This is as follows: "Higher homologues → xylenes → toluene → benzene → naphthalene → anthracene → carbon and hydrogen."

Effect of Gaseous Atmospheres: The effect of nitrogen and hydrogen atmospheres respectively upon the decomposition of ethane at high temperatures has been studied by Bone and Coward. At 800° C. for one hour in nitrogen the ethane was completely broken down, the products being methane, carbon and hydrogen. When the hydrogen atmosphere was used 80% of the carbon content of the ethane appeared as methane. This is 2.27 times as much as was obtained when the nitrogen atmosphere was used.

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The above conclusions apply, in general, to temperatures up to 1,600°F., which is about the upper limit of the experiments made, so far as data are available.

In plants making gas to a heating-value standard, it would seem, on consideration of the above facts, that the higher the temperature carried the more favorable would be the results. However, the formation of an increasing amount of carbon from the oil, as temperatures increase, and an increasing formation of naphthalene preclude the possibility of operating with temperatures much in excess of 1,400°F. With excessive temperatures, carbon rapidly clogs the interstices between the checker bricks and the offtake connections of the gas set. The naphthalene is carried forward some distance with the gas, and, when cooled, is deposited upon parts of the works connections and of the distribution system that are difficult to reach, causing serious stoppages.

It is therefore generally desirable to operate with as high a temperature in the check chambers as good practice has shown to be consistent with the above facts. Temperatures between 1,300 and 1,400° F. seem most favorable when the ordinary gas oils are used."

Whitaker and Alexander have studied the mechanism of oil cracking and conclude as follows:

"I—The control of the composition of the products obtained in the manufacture of oil gas involves not only thermodynamics but also chemical kinetics.

II—In practice, equilibrium is not reached in the thermal decomposition of petroleum products. This is proved by the fact that a recirculation of the products, under the same conditions at which they were generated, results in a further change in composition.

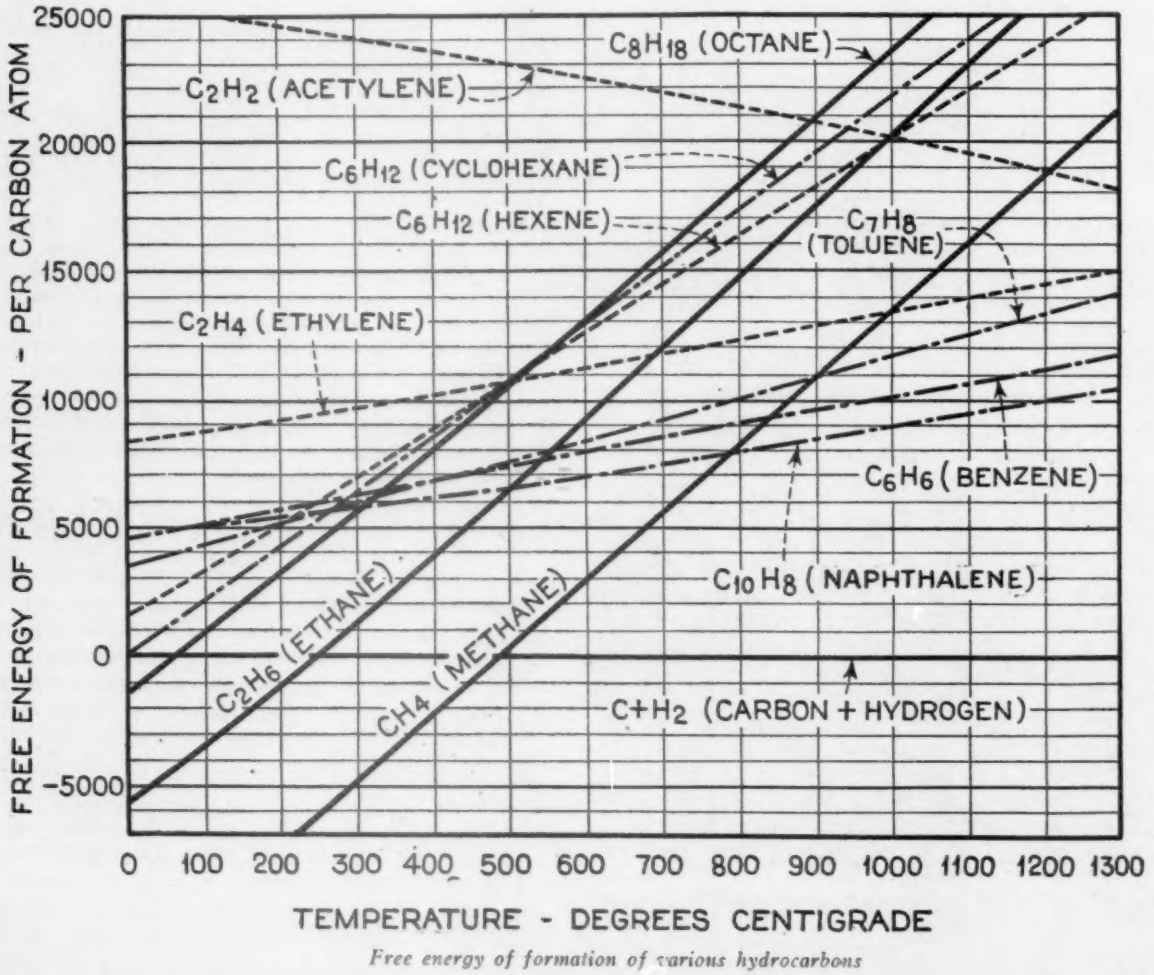
III—The time factor, which is controlled by the rate of oil feed, is just as important as are the other variables, (temperature, pressure, and concentration), as it has been found that composition of the products obtained in making oil gas vary with the rate of oil feed. Hence, from the standpoint of practical operation of an oil gas plant, the rate of oil feed offers an easily accessible means of control.

IV—Maximum and minimum percentages of the various constituents in the products formed by the decomposition of petroleum and petroleum products by heat can be obtained by a proper adjustment of the variables.

V—Petroleum hydrocarbons can be completely decomposed into carbon and hydrogen only within well defined limits of the four variables. In this investigation the range of complete decomposition at a definite temperature and pressure was limited by definite rates of oil feed.

VI—Oil gases containing equal percentages of illuminants can be produced at different temperatures by varying the rate of oil feed. Such gas mixtures, although they have equal percentages of illuminants, do not in general have equal percentages of saturated hydrocarbons and hydrogen, i. e., gases of equal illuminating values are not necessarily of equal thermal values.

VII—In an isothermal decomposition of petroleum hydrocarbons, maximum yields of gas and minimum



Free energy of formation of various hydrocarbons

yields of tar are characteristic of equilibrium compositions."

The Thermodynamics of Oil Cracking

Recent contributions to the thermodynamics of some of the hydrocarbons involved in cracking has been made by Smith and by Francis. Their papers have been published in the 1927 and 1928 volumes of Industrial and Engineering Chemistry.

By means of free energy data Francis has derived equations for the free energies of the formation of methane, ethane, octane, ethylene, acetylene, benzene, toluene, naphthalene, and cyclohexane, and has plotted the equations with the ordinates reduced to free energy of formation per carbon atom. A copy of this chart is included herewith. This shows stability relations between the various hydrocarbons at various temperatures. The handling of the free energy data is in accordance with the development discussed by Lewis and Randall in their work "Thermodynamics." In using the chart it should be remembered that only those compounds are stable whose free energies of formation are negative. Thus it will be noted that only the paraffins and the higher olefines have any thermodynamic stability and that above 260° C. methane is the only stable hydrocarbon. Francis points out that this seems to be inconsistent with the ordinary cracking reactions in which large quantities of olefines and some aromatics are produced from the paraffin hydrocarbons. Actually, however, this contradiction is not present because thermodynamics does not show the mechanism by which the reaction proceeds and the formation of intermediate products is more a matter of kinetics rather than thermodynamics. Thus, while at equilibrium conditions all of these compounds whose free energies of formation are positive give carbon and hydrogen, under the commercial conditions of cracking true equilibrium is not obtained and intermediate products are instead obtained. The quantity and composition of these are determined by relative reaction velocities. Francis points out that no paraffin hydrocarbons should be capable of direct condensation to a higher hydro carbon; but if lower ones are formed simultaneously with the higher ones, there is no change in free energy of gaseous reactions.

The chart may be used for a number of interesting observations, thus it will be seen that if it is proposed to make benzene from methane the temperature of 850° C. must be exceeded if a substantial yield is desired.

Recent Study by Fischer on the Production of Aromatics from Methane

This matter of producing aromatics from methane has been studied by Fischer. He points out that both temperature and time of heating are of importance. Thus, if the heating is over 60 seconds the hydrogen is entirely split off from the carbon as would be expected from the thermodynamic considerations. Below 900° C. the reaction velocity is very slow and Fischer says that the methane is not decomposed without a catalyzer even at low velocity; 1200° was found to be too high for pure methane, thus indicating that there is both an optimum temperature and an optimum period of heating for the formation of aromatics. These considerations of temperature and time are to be expected for cracking processes in general as the foregoing studies have indicated.

A Practical Application of the Factors Which Control Cracking

An interesting practical application of the factors which control cracking has been made in the study reported by George E. Wagner of the Madison Gas and Light Company and published in the *American Gas Journal*, Volume 125 (1926), pages 520 ff. Gummy deposits were giving considerable trouble at Madison, Wisconsin, during January, 1925, and accordingly an investigation was made of conditions which cause and prevent the cracking of gum-forming styrene and indene. From this study it was concluded that the essential requirements for the most effective decomposition of the oil given in sequence of their importance, are "(1) Fineness of division of the oil, (2) temperature, (3) intimacy of contact, and (4) rate of oil input." In order to secure the required completeness of cracking necessary to reduce the styrene and indene content, this study showed that it was most important to improve the fineness of dispersion of the oil from the oil sprays.

Evaluation of Oil: Considerable attention has been given to the evaluation of oil for carburetting water gas and much of the discussion by Downing and Pohlman has been devoted to information revealed by such items as odor, color, specific gravity, refractive index, surface tension, viscosity, flash and burning points, heating values, fractional distillation, ultimate analyses, sulphur, sulfonation and bromination. It may be said in general that the methods for differentiating between the gas making values of various oils are not in a very satisfactory state. It is generally held that no simple quick test can be made the basis for determining the correct value of a particular oil and many of the properties shown by the tests listed above are chiefly of interest because they make it possible to develop oil specifications which enable the purchaser to know whether or not the oil he buys is similar to an oil which he has already used.

Importance of Distillation Test

Some importance is given to the distillation test and it is held that the value of the fractions resulting from distillation increases as the temperature of distillation rises. This is especially true when the fractions increase in volume up to 700° F. This distillation is ordinarily made on the Fahrenheit scale, cutting factions at every 100°. For a given boiling point the value of any fraction increased as the specific gravity decreased because the lowered specific gravity indicates an increased amount of paraffins.

Low sulfur is, of course, desirable because this simplifies the purification problem.

The evaluation of gas oils has recently been considered by the American Gas Association. A subcommittee of the Chemical Section, under the chairmanship of Dr. Wing, reported to the 1927 convention on this subject. An important part of the deliberations were contained in a paper presented to the Chemical Sessions of the American Gas Association by T. A. Mighill. This paper proposed the following provisional efficiencies for each of the series of hydrocarbons:

For the paraffins	100% (Arbitrary)
For the naphthenes	70% (Relative)
For the aromatics	50% (Relative)
For the unsaturates	25% (Relative)

and indicates some possible characteristics by which the

relative amounts of these various series can be determined.

Ross and Leather after extensive researches on oils conclude:

(1) Open chain hydrocarbons have the best value for gas making.

(2) The presence of double bonds in the chain slightly reduced the value.

(3) The presence of one or more rings considerably reduced the value.

Odell and Dunkley state that the following classes of hydrocarbons are valuable for enriching in the order named: (1) paraffins, (2) olefines, (3) naphthenes, (4) asphaltics, (5) aromatics.

In general, gas companies rely largely upon the cracking tube test as described by Downing and Pohlman for evaluating their gas oils.

Compressed Gases Fuel Graf Zeppelin

An important problem confronting the designers and operators of lighter-than-air craft is to keep the lift of the ship approximately constant at all times, although the weight of fuel is constantly diminished as it is consumed during the cruise. This could be accomplished by valving off part of the levitating gas, but as it is a costly and wasteful process, means have been found to avoid it.

In the case of the Los Angeles, which is helium filled and uses gasoline as fuel, the lift of the ship is kept constant by condensing the water of combustion from the exhaust gases of the motors. The Graf Zeppelin, however, uses hydrogen as the levitating gas because hydrogen is much more easily obtainable than helium and has greater lifting power. A gas carried in separate balloonettes in the interior of the ship, supplies fuel for the motors. The lift of the ship is kept constant by using a fuel gas having approximately the same specific gravity as air. Thus the load is not diminished as the fuel gas is consumed.

The Graf Zeppelin was fueled at its home port, Friedrichshafen, with Blau gas. This gas, which is produced by cracking oil, is extremely suitable as it has about the same specific gravity as air and high fuel value. Since this gas is not available at other places, different arrangements had to be made at the other airports at which it was proposed to refuel on the globe-circling flight.

Chemists of the Linde Air Products Company and the Carbide and Carbon Chemicals Corporation, both units of the Union Carbide and Carbon Corporation, were consulted as authorities on the manufacture and use of fuel gases. They expressed the opinion that ethane would be the ideal gas to use as it about the same weight as air and has a very high fuel value.

Sufficient ethane for the first leg of the cruise, from Lakehurst to Friedrichshafen, was accordingly sent to Lakehurst, compressed into steel cylinders, from the Carbide and Carbon Chemicals Corporation plant in West Virginia. Ethane was successfully used on the first leg of the flight.

Upon its return to Friedrichshafen the dirigible was refueled with Blau gas for the flight to Tokio.

But economic as well as scientific considerations being an important factor, Pyrofax, mixed with hydrogen, was used as a fuel for the third leg of the cruise from Tokio to Los Angeles. Pyrofax, which is also manufactured by the Carbide and Carbon Chemicals Corporation, is best known as a fuel gas for gas ranges in rural homes or in districts not served by city gas mains. It is not as suitable as ethane for use in the Zeppelin, being somewhat heavier than air, but as it is easily liquefied at comparatively low pressure, it could be shipped to Tokio from West Virginia in a much smaller number of cylinders than could ethane, and at proportionately less expense. It was therefore used, mixed with sufficient hydrogen (locally obtained) to make the specific gravity of the mixture approximately the same as that of air.

For the last leg of the flight, from Los Angeles to Lakehurst, Pyrofax was again used. This time it was shipped from West Virginia in tank cars, thus further reducing the cost of transportation. At Los Angeles the Pyrofax was mixed with a suitable volume of California natural gas to make the specific gravity of the mixture approximately the same as that of air.

Recent progress of compressed gas manufacture, which has made various gases commercially available for the requirements of industry in convenient steel containers, has made the epoch-making flight of the Graf Zeppelin possible.

Gas Business Not Saturated

Industrial and commercial development of an unusual magnitude for the West, due to the rapid growth of the Natural Gas business in that section, was predicted by Bernard J. Mullaney, Vice-President of the Peoples Gas Light & Coke Company of Chicago, and Vice-President of the American Gas Association, in an address before the Colorado Public Utilities Association convention.

Mr. Mullaney called attention to Denver with its five hundred-mile natural gas line from the Texas Panhandle, the line from Ute Dome, New Mexico to Durango, Colorado, the new line to El Paso, the contemplated line to Roswell, New Mexico, the line from Caspar, Wyoming to Salt Lake City, the developments of similar nature in Montana, and the proposed extensions to the states of Oregon and Washington.

"Some years ago we used to hear more or less about the gas business having reached the 'point of saturation,' said Mr. Mullaney, but it has gone right on showing substantial increase in out-put and sales every year. This increasing output, for an industry that is well into the second century of its existence, is an emphatic negative to the 'saturation' talk.

"These extensions of natural gas into your region means an industrial development hitherto undreamed of out here; industries without smoke and related annoyances; home comforts and conveniences otherwise unobtainable; an influx of both capital and population and all the consequences thereof; multiplied opportunities for engineers, salesmen, accountants, sales managers, executives, and all the other factors in the machinery of industry and commerce."

Gas Leakage—The Chemical Way

An effective and money-saving method for locating leakage in a Natural Gas distribution system

By E. A. Munyan

Manager, Gas Department, Union Gas & Electric Company, Cincinnati

ALL gas men are bothered from time to time with the problem of gas leakage and attempt its elimination as far as possible. Its importance can be realized when one considers that there is a total yearly gas leakage in the United States of 90,000,000,000 cubic feet.

There have been employed many methods for determining and estimating gas leakage by gas operators and others interested in the problem. Some of these are as follows:

Checking input gas to the system and comparing it with the totals of customers' meter statements.

Checking individual districts with separate meters for the district or section of the city to be checked and then shutting off all services and meters in the district to be measured.

Checking night flow of gas on off-peak periods.

Searching for leaks by barring over mains and services and using the sense of smell to determine leakage.

Using flames and flashing of leaks.

Trailing leakage by following out electric and telephone ducts from manholes.

Sampling gas content of manholes with Wolfe Lamps or by chemical analysis.

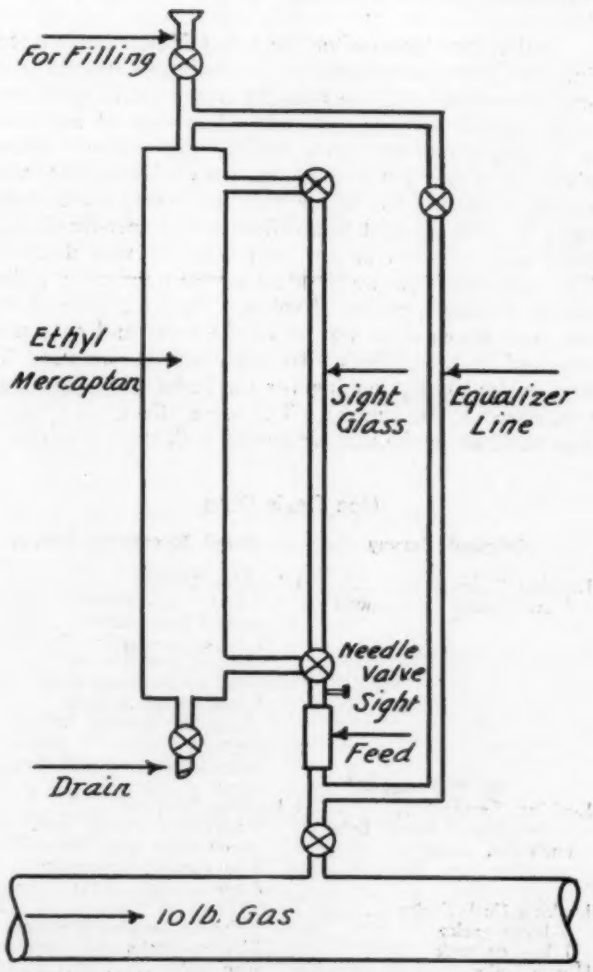
Recently there has been put on the market an electrical device for determining the gas content of manholes with the aid of electrical resistance on the Wheatstone Bridge principle.

Warning Agents Test

The Bureau of Mines has recently been conducting some tests on Warning Agents to be mixed with natural and other gases, and have used a great number of chemicals, one of the most successful being Ethyl Mercaptan as tested at Linton, Indiana. Here Ethyl Mercaptan, among others, was used in a mixture with propane and gave excellent experimental results. In April, 1929, the writer visited the Linton plant and made a study of the mixing of Warning Agents with such a gas as natural from either the Ohio or West Virginia and Kentucky fields. He determined that the idea was worth trying and especially on one of the small properties under his jurisdiction.

In a distribution system supplying manufactured or mixed manufactured and natural gas, the manufactured gas—being either coal gas, coke oven gas, or water gas—gives the resultant gas a distinctive odor very familiar to practically all gas men of any manufactured gas experience. With such an odor, leaks can be readily detected and finally located. With natural gas, the odor is not so pronounced and is more of the nature of a kerosene odor, but not nearly so pungent. Such gas is also, as is well known, not nearly so poisonous as manufactured gas, as it contains very little if any CO.

Franklin, Ohio, was the town selected for the practical work of the experiment, a town of 3500 population and 1101 meters. This town is fed straight natural gas at 4 oz., or 6.93 inches pressure by the Union Gas & Electric Company whose headquarters is at Cincinnati, Ohio. The first thing done was to make a complete leakage survey inside and outside of consumers'



Apparatus for introducing warning agent into gas line

premises with the regular operating force. This consisted of barring over mains and services, checking and flashing curb cocks, testing meter connections, and testing house lines. This took 64 days with the use of two men. Leaks coming under the responsibility of the Gas Company were repaired immediately, and those on house lines for which the consumer was responsible were called to the attention of the consumer with the suggestion that they have a plumber repair the leaks before a certain period when the lines would again be inspected. Of course, large or otherwise dangerous leaks meant the immediate shutting off of the gas until the leaks were repaired, and passed inspection by the Gas Company. A re-inspection was made and finally all leaks, as far as known, were repaired and the system was considered as satisfactory as possible to make it.

It was then decided to mix Ethyl Mercaptan with the Natural Gas at the town border measuring station before it got into the gas distribution system. Simple apparatus was used as shown in the accompanying figure and just enough of the chemical was introduced to give the natural gas a distinctive odor. The amount of 0.81 parts per M, or 0.2 oz. per M ft. of gas passed was determined from previous experiments conducted by the Bureau of Mines. An Associate Chemist from the Bureau of Mines was in attendance and co-operated with us in the practical study of this leakage investigation.

Within two hours after the Ethyl Mercaptan was fed into the lines, complaints of gas leakage came in from consumers on what we thought was a fairly good system. These were immediately taken care of and then a re-inspection of curb cocks was made. After seven days the percentage of Ethyl Mercaptan was doubled. Seventy-five house leaks and seven street leaks came in with the first proportion, and ninety-five house leaks and nineteen street leaks after it was doubled. The table below shows the data on the number of leaks, and is, I believe, rather of value. The total time of the test was eleven days, but all of the leaks and data was obtained in seven days. In other words, we used 57 days in previously looking for the leaks with what was considered a fair success. The same effect, or greater, was obtained in the shorter period with the Chemical.

Gas Leak Data

Original Survey		Ethyl Mercaptan Survey	
Leaking Mains:	1	Leaking Mains	6
1 steel main eaten away		1 leak at service fitting welded into main	
		1 broken gauge line fitting on medium pressure main	
		1 steel main eaten away	
		1 leak at tee at curb	
		1 leak at service fitting at main	
		leaks at expansion joints in main	
Leaking Services	1	Leaking Services	5
1 coupling leaking between curb and main		1 service line eaten away between curb and house	
		2 service lines eaten out	
		2 service lines broken at cock	
Leaking Curb Cocks	5	Leaking Curb Cocks	15
4 loose cocks		1 threads broken in cock	
1 broken cock		14 loose cocks	
House leaks	238	House leaks	151

Gas Company executives may shy off at such a manner of looking for leaks on account of the possibility of adverse criticism, but the effect on the public was just the opposite of what might be expected. The public, instead of blaming the gas company for the leaks, were glad of the opportunity of determining where the leaks were, as a large number were inside of the buildings, These, usually considered of a very minor nature, might have developed into serious leaks in the future. It is a well known fact that the leaks in most large cities become noticeable due to the congested system of the buildings, and by the travelling of gas into buildings under solid pavements by following the line of least resistance.

There were several net results of this practical experiment with Ethyl Mercaptan. In the first case, where the Gas Company tried to find the leaks under the usual system the cost was paid by the Gas Company. In the second case, the consumer reported the leaks in a very short time. In other words, we had at least 177 inspections in the city by consumers without any inspection cost to the Company. Of course, we had a Superintendent, a Cadet Engineer, and others on duty to take care of the situation, but the consumer actually did the work of reporting the leaks to us over the phone. This would, of course, be the case in other situ tions.

There were several amusing incidents connected with the test. One man had bought a piece of meat from the butcher and on his arrival home smelled a terrible odor. He immediately returned to the butcher with the meat which he thought was tainted. Another old lady smelled the Ethyl Mercaptan and went upstairs and threw out a collection of old shoes which she thought was the cause of the odor.

Conclusions

There are several conclusions which might be drawn from the results of the tests. In the first place, the cost of such a leakage survey is considerably less than the cost of the ordinary leakage survey, even at a cost of approximately $1.30 per lb. for the chemical, on account of the very little time taken for the inspection. In the second place, the test can be made at any period of the year, winter or summer, and is not dependent on the weather. Last, a test such as above, if conducted at periods of one, two, or three years apart, may avoid gas leakage and particularly on natural gas properties where there is no distinctive odor to the gas.

It may be of interest to know that since conducting the above test on the city of 1,101 meters we have given orders to proceed and try it in another city with 7,860 meters. This will be rather interesting as this city is very much spread out and we will probably find a considerable number of street leaks. The system is worthy of consideration by those companies with high leakage, and especially to those using straight natural gas. The cost will be repaid many times. The odor of Ethyl Mercaptan once smelled will never be forgotten. It is not new, neither is the above scheme new, except in its practical operation. It has been tried in Europe in years past, and was tried once before in the southwest. It can now be used in a practical way by anyone interested, and will probably pay rich dividends in reduced costs of leakage determination.

Temperature Control of Gas-Fired Furnaces as Related to Production Costs

By Alvin M. Stock

The Partlow Corporation, New York City

TO connect temperature control to production costs is not as direct as the path at first would seem. It is necessary first to describe to the average manufacturer what temperature control is, and what he may expect from its use. To introduce to him the relation between control and production costs, he must be shown that temperature control effects those things which decide the cost of his production, mainly economic use of fuel, labor and material.

Temperature is a vital factor in an enormous number of industrial processes to-day. Since it costs money to produce temperature, it is absolutely essential to have close and accurate control of temperature. As the economics of operation directly determine the production cost, it follows unquestionably that the control of temperature likewise determines the production.

Reducing Production Costs

This is a fact to which many business men have in the past given but little consideration. Its acceptance to-day, however, is being rapidly extended because of the keen competition being met in the industry. Because of this condition every manufacturer is extremely interested in ways of reducing the production cost. One sure way is to minimize errors in manufacture, eliminate guesswork and make the process fool-proof as far as practical. Perhaps the largest contributor to this error and guesswork is the human element. The modern executive, realizing this, eliminates this human element as far as possible replacing the same by reliable and competent automatic machinery.

Since temperature is such a vital part of the majority of manufacturing processes, it is again absolutely essential to remove the error in its connection. The old method of determining temperature by the "eye" must be discarded as guesswork even at best. Nor does the more practical introduction of some form of thermometer or pyrometer in the process dispense with this human element. The point is: why not do the same for temperature processes as has been done in machinery processes—make it automatic as well. Do not stop half way; be consistent and carry the thing right through to a satisfactory conclusion.

Wherever more than one piece of work is produced and the temperatures of the heating operations differ, the products must differ also. In order to duplicate work, the temperature must be the same in each case. So that for a successful and economic production of work the temperature of the heating process must remain constant or else uniform work cannot be realized.

The function which automatic temperature control successfully performs, is to maintain this constant temperature, or to raise or lower it according to some predetermined schedule. With such equipment "hand control" is largely eliminated. Through the medium of some of the higher priced and more elaborate control systems, some of the most complicated hand controlled operations may be easily duplicated automatically. In these instruments even the time element is controlled.

There is therefore little excuse for the lack of temperature control in the majority of manufacturing processes; indeed, on the contrary there is almost always at least one good reason why the process should be controlled and controlled automatically.

Once the desirable relation of time and heat factors has been determined for a given process the question always arises "How to get it again and again?" Luckily, the variety of Automatic Temperature Controls already available for use is large, and a ready selection may be made to fit the particular process at hand.

The claims for temperature control are many and in some cases ingenuous, depending on the individual resourcefulness of the control manufacturer. In general they may be reduced to a few fundamental facts readily conceded by all. The scope of this paper permits the discussion of only those which can be readily substantiated, and which fit the majority of processes where temperature control is a prime factor. Space does not permit even a detailed discussion of these; they can only be referred to in a general way.

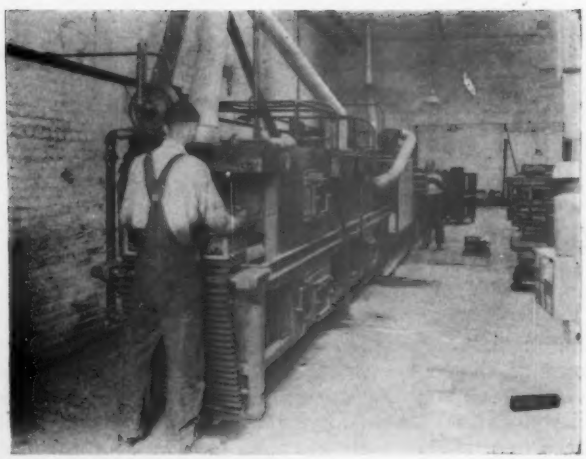
Advantages of Control

The inherent advantages of automatic temperature control may be classified as follows:

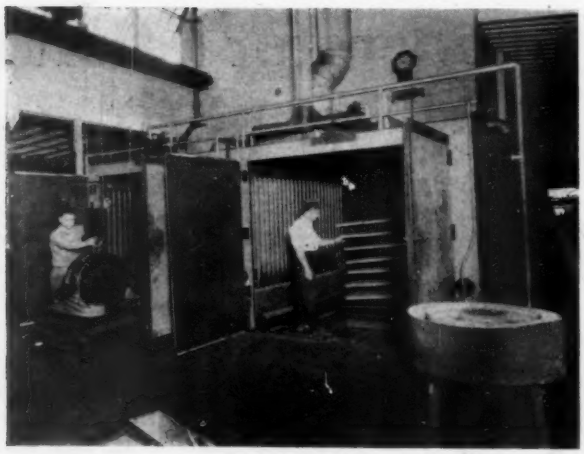
1. Effects a saving in fuel.
2. Prevents loss of material, labor, fuel and manufacturing time caused by spoilage and rejection.
3. Saves labor by relieving workmen of adjusting burners and watching temperature—releasing him for more productive work. Effects saving in linings of gas appliance lowering repair costs.
4. Guarantees uniform and quality production.
5. Insures increased production.

The ultimate benefit of automatic control is, therefore, that it makes possible reduced production costs, the real goal of all industry.

This sounds like a large order to fill and yet upon stopping to analyze each item above mentioned, its truth at once becomes apparent; automatic temperature control is then presented in an entirely new light and its possible use becomes significant. An imaginary view as expressed in terms of initial cost of the control equipment has previously made the other considerations obscure. Yet the fact of the matter is that there are few automatic temperature control installations where the initial cost of the equipment does not become insignificant when correctly balanced against the accrued



Automatically controlled ovens for uniformly baking armatures



Immersion heated metal washing and drying machine with automatic control

benefits made possible through the medium of the control system.

Generally considered, an instrument which will effect a saving equal to its own cost, in many cases, in less than a year is an excellent investment.

In this light automatic temperature control is far from being an expense as it first appeared—an initial expenditure tending to increase production costs. On the contrary, in reality it is an investment bearing returns which undoubtedly reduce operating or production costs—increase production and cause a realization of a uniformly even product.

There is no question but what heat is saved if a furnace is not overheated, and work is not rejected. Every time the furnace is over temperature, everyone knows more fuel must have been consumed than was necessary to bring it up to the desired temperature. Everyone will also concede the fact that if work is rejected after passing through this furnace the heat expended in bringing the furnace and materials up to temperature is also rejected or lost with the work. The latter (work) may in some cases be partially reclaimed but the lost fuel is gone forever. Hence, fuel saving is a valuable item in reducing production costs, and as automatic temperature control effects this fuel saving by preventing this overheating and by maintaining constant and uniform temperatures, automatic temperature control incidently is a factor in reducing production costs.

A Narrow Viewpoint

Too many manufacturers, however, consider only this one item when budgeting the initial cost of temperature control equipment against saving in operating costs. Naturally this is a false statement of facts in that it is only a partial statement of benefits.

Such a point of view is narrow and indicates either a lack of foresight on the part of the manufacturer himself or more probably lack of a thorough analysis of what temperature control really means. Experience has shown that the saving in fuel afforded by control is often rendered insignificant when compared with the possible earnings which accrue in other directions, such as saving in materials itself, saving in labor and manufacturing time;—and because of these—savings in production costs.

It very frequently happens that the cost of the material in the furnace at any one time is greater than the actual cost of the automatic temperature control. If then this material is saved from damage by excessive (or too low) temperatures, the cost of the material thus saved may be charged off against the cost of the control effecting the saving. Hence, if the instrument functions but once such an instrument becomes a valuable asset to the plant; it has converted a probable liability into a paying asset. Many cases can be found where the adaptation of temperature control makes the fuel saving considerations negligible indeed. Where inflammable materials are being heated either as part of the ware being produced (such as japanning, enamelling or lacquering of metal wares) or as the material itself (such as tars, oils or varnishes), control of temperature is a dire necessity from the fire hazard point of view, alone.

Fire Hazard Factor

The matter of quality and uniformity as required in heating colored enamels although of prime importance to the manufacturer, is in reality secondary when considering the possible loss of his plant by fire. For if this inflammable material is permitted to overheat and reach its flash point—the point at which the volatile vapors being emitted from these materials catch fire—enough free air being present, these wares will burst into flame. The work is then ruined, and the material, labor and fuel accompanying it through the process are lost with it. Furthermore, the oven or furnace may have been damaged by explosion, arresting its use until the damage is repaired. Here the initial cost of temperature control may be equated against the cost of the oven, or even the plant itself, plus the cost of subsequent delays due to loss of same.

The loss of the ware or rejection of it because it is "off color" as frequently occurs in colored enamels, means duplication of work and taking up of valuable manufacturing time which might have been utilized in the production of new work. With uniform temperature off coloring is practically eliminated; automatic temperature control insures this condition beyond a doubt.

No amount of persuasion is needed to convince anyone that, aside from the conceded saving in labor re-

sultant from preventing duplication of work due to spoilage, there is an attending saving in labor cost in relieving the workmen of the necessity of regulating fuel valves, burners or switches and of watching the temperatures. These workmen may employ their time to advantage to the company in other productive work. The labor thus saved and liberated in other channels is sufficient in many cases to repay the cost of the temperature control equipment within a few months. As any saving in labor is reflected in production costs, automatic temperature control can be held responsible for this reduction in cost also.

The newspaper plant's temperature plays an important role in the composing rooms and stereotype departments. It is here that the metals are melted and cast into type or plates for the huge printing presses. The metal temperatures are important in that the character of the type depends upon it as much as anything else. As long as the metal is held at the same temperature uniform sound slugs or castings will be formed and no delay in printing the paper will occur due to poor type, which formerly was a serious consideration in getting the paper on the streets in the shortest possible time.

Speeding Production

Having shown that automatic temperature control conserves fuel, material, labor, manufacturing time, etc., it naturally follows that the more labor and time are saved, the more new work can be produced.

Where uniformly correct temperatures are automatically maintained the work proceeds continuously, without interruption, insuring increased production over a furnace in which fluctuating temperatures cause the work to be non-uniform and hence partly rejected. Thus, automatic temperature control undoubtedly insures increased production from the furnace or other appliance to which it is attached. Naturally the greater the production, the less the production costs, within reasonable limits; so that here again lower production costs may be charged directly to automatic temperature control.

Furthermore, from a sales point of view, maintenance of ideal furnace conditions by reduction of quantity of materials rejected as "seconds" or "scraps" causes increased revenue to the company by increasing sales of first line wares. It creates the reality of sale of a "quality products" and a "uniform product."

These expressions are commonly utilized as "sales points" in securing new or holding old business. To prove to the buyer of a firm that he is going to receive uniform quality, he must be shown how he will get it. Automatic temperature control is the finest proof that he will obtain the quality he desires, for it indicates the sincerity of a manufacturer to produce a quality product. All this tends to increase sales, which in turn increase production and in the end reduce production costs per amount of work.

In conclusion therefore, even though combustion equipment be of the most modern type and handled by skilled operators, there are few cases where automatic control of temperature does not result in a superior product, a saving in labor, and economy of fuel. So marked are these advantages that provision for such control will soon be recognized as a fundamental consideration in the selection of equipment for the combustion of gaseous fuels. The ease with which it lends itself to automatic temperature regulation by the use of proper control equipment makes more secure its place as the leading industrial equipment and fuel.

The proof is that automatic temperature control when properly applied is extremely vital to production costs.

Living Capital

The age-old idea that "life is cheap" is forcefully discredited by the Insurance Department of the Chamber of Commerce of the United States, which estimates that, from an economic viewpoint, human life in the United States represents a value of $1,500,000,000,000. This figure is arrived at by taking the excess of earning capacity of individuals by age groups and sexes over the cost of maintenance.

The drain on this reservoir of living capital is due to sickness and premature death. The average citizen is said to lose about seven days each year due to sickness, which corresponds to a loss of 2 per cent in useful industrial or commercial productivity. This figure in round numbers for the entire country amount to $1,250,000,000 annually. Added to it there is also the cost of medical and hospital service which has been estimated at $10 per capita, or more than $1,000,000,000 each year. Premature death accounts for an even larger loss, conservatively estimated to be $6,000,000,000 annually.

This drain can be measureably checked by concerted effort because many of the diseases are known to be preventable and many deaths are known to be premature. With a view to putting effort in this direction by various communities on a competitive and comparable basis the National Chamber has instituted the National Inter-Chamber Health Contest.

High Nitrogen Content of Washington Coals

A survey of the composition and characteristics of the coals occurring in the State of Washington, now being conducted by the Northwest Experiment Station of the United States Bureau of Mines, Department of Commerce, Seattle, Washington, in cooperation with the University of Washington, has drawn attention to the exceptionally high content of nitrogen in some of the coals found in that state. Usually the nitrogen content of coal on the as-received basis varies from 0.75 per cent to 1.70 per cent with an average of about 1.35 per cent.

Most of the coals in Washington approach these percentages of nitrogen. The high-rank coking coals of Pierce County, however, contain an average nitrogen content of 1.95, some samples showing as much as 2.30 per cent. It is probably a coincidence that those coals which have been most greatly altered by metamorphic action contain the greatest percentage of nitrogen. The content of nitrogen on the as-received basis in high-rank coals is, of course, increased by the low moisture content normal to such coals. So far as is known, the Pierce County coals are uniformly higher in nitrogen than any of those produced in any foreign countries, with the exception of certain coals in South Africa and Manchuria that contain up to 2.3 per cent nitrogen.

Complaint Handling A La Mode

By H. T. East

Assistant to Vice-President, Public Service Company of Northern Illinois

MR. H. P. CUSTOMER rushed defiantly into the general office of a certain large gas company demanding to see personally the highest officer around. He had been wronged and then defied. His intelligence even had been affronted and he had traveled twelve miles to carry the war into the enemy's territory, to lay the case before the higher officers of the company before taking more drastic steps.

Calmly and courteously greeted, he was invited to sit down and assured that the company was not only willing but eager to correct any wrong. It was a high bill, twice as high as usual despite a normal use. The first glance of the company representative showed the cause. It was a bill covering a two month's period as the reading dates plainly showed.

Missed Opportunities

This explained, the customer somewhat ashamed transferred his wrath to the company representative in his home town office where he had originally complained. It followed that he had presented the bill with a protest and had been entertained for 45 minutes with how the quantity of gas indicated on the bill might have been used. The weather, guests, preserving, waste, excessive bathing, and many other possibilities were advanced as probabilities. Disgusted and enraged the skeptical user had to take time and trouble to appeal to the general office in a matter that was as simple as double bill for double period. This case, which is neither typical nor unusual, actually occurred. It shows that near the beginning of estrangements is often some missed opportunity to avoid the dissatisfaction that followed.

Complaints are inevitable in the public utility business. Though much can be done toward removing the causes and thereby diminishing the number, we will always have them, both justified and otherwise. Human nature alone would insure this even were the gas business fully understood by the public, which it is not, and all features of service perfect, which they are not. Complaint handling will always be a problem.

With the general awakening of the utility industry to the necessity for improving public relations, complaints received much consideration. A great deal was written and said about them; but for the most part this material consisted of restatements of admitted facts, the reason complaints deserved careful attention, and the value to the company of intelligent handling of customer dissatisfaction. It is not my purpose to repeat again these obvious truths, but rather to briefly review developments which have produced a new order of things, new fashions, or complaint handling a la mode.

Sources of Dissatisfaction

Causes of customer dissatisfaction are about the same as they always have been except perhaps that house heating and multiplied application of gas have introduced new problems which are sometimes difficult of solution. All customer complaints fall under one of two general headings: justified and unjustified. A careful analysis of a large number of justified complaints shows with surprisingly few exceptions they are due to some act or failure to act by an employe. Practically all could have been prevented had a company representative been more careful, more efficient, or more tactful.

Classifying further, justified complaints can be placed in one of three groups: (1) Those caused by lack of information or knowledge concerning job, business, policy, or procedure—employes who did not KNOW. (2) Those caused by errors and mistakes, thoughtless failure to perform work in a proper manner—employes who did not THINK. (3) Those caused by some one's failure to perform an expected service or to perform an expected service at the right time—employes who did not DO. All these might be recombined under one heading—employes who did not care; for if they cared enough they would thoroughly know their job, would think what they were doing, and do what they should do.

Complaint prevention is in the final analysis largely a personnel problem. Justified complaints are traceable to a failure to carefully select employes, lack of proper education and training, and absence of right attitude on the part of employes. Bear in mind that this applies to all employes, not only those who handle complaints after they are registered.

Better Paid Employees Will Help

A higher type of employe, better paid, will help avoid complaints. As an answer to the objections such a recommendation will bring, it may be pointed out that the additional expense will be offset by reduction in costly complaint handling efforts.

Although personnel development is not directly concerned with complaint handling procedure a few comments are in order.

Lectures or talks are of little value, even where good material is collected and properly presented, because they smack too much of preachment, rarely develop real interest, and leave ideas that are seldom long remembered.

Job manuals are valuable if well gotten up, but only the more progressive members study them intently. Those who need the information most absorb but little. Another disadvantage of job manuals lies in the fact that they cover normal procedures and generally do not contain information for guidance in handling the unusual condition which causes the most trouble.

Inspirational leadership by officers and department heads, which in various ways produce a proper employe attitude or company spirit, is a very productive means but one which depends almost entirely upon the personality and natural leadership qualifications of the officers.

The group conference training method is a newer form of training and education which has produced excellent results. Small groups of employes doing similar

work are assembled to discuss their work, objectives, and problems under the direction of an experienced conference leader whose job is to present problems and draw out the opinions and experience of each member.

Each employe contributes his ideas and thoughts and the final result is that the entire group is equipped with the phraseology, practice, procedure, and policy which are agreed upon as best for any given situation. These meetings are interesting and deal with specific problems. No better plan for informing employes and imbuing them with genuine interest in the customer and equipping them to handle unusual cases has yet been worked out. The plan is suitable for either original or continuation training. Its adoption will eventually reduce complaints.

Unjustified Complaints

Complaints which have no justified basis for dissatisfaction (and these are many) deserve as much attention as the justified ones since the customer nearly always sincerely believes he is justified. Unjustified complaints have as their general underlying cause a lack of information on the part of the public concerning gas, its manufacture, distribution, and utilization and rules, regulations, policies, or charges affecting the user. The remedy is obviously the education of gas users in such matters. One method is to make sure that the reason for charges, restrictions, or inconveniencing actions is carefully explained beforehand. Informing customers is a big undertaking, but steady progress is being made through advertising, public talks, and inviting customers to visit gas plants and company offices.

What to Avoid

Some authorities feel that complaint handling is being overdone. A recent checkup reveals some basis for this belief. Many companies have organized special service department to handle such matters. This plan has much merit but one danger is that those chosen to investigate complaints and settle them may unconsciously develop high pressure sales complexes, feeling that their duty is to close the case rather than to lead the customer to understand it. This growing tendency to out-talk the complainant and convince him that "everything is all right" is not psychologically sound. If he is to be an effective good-will builder employe must feel that his duty is to furnish facts and information to complaining customers which will bring them to see that the company was not at fault. Where fault does exist it should be frankly admitted and promptly corrected. The complainant deserves genuine thanks for having given the company opportunity to correct the error.

Psychology

Any discussion of complaint handling with those engaged in the work usually brings forth the statement that it is often impossible to settle complaints and satisfy customers. This attitude constitutes a serious deterrent in complaint handling. If the contact employe believes that a certain percentage of his calls are destined to be ineffective, he will naturally so classify many cases. This means he will cease his effort whereas a continued effort might result in success. Then too, one man may fail where another with a personality, manner, or viewpoint better suited to deal with some particular customer, would succeed. It is better for the person in charge to adopt the attitude that all complaints can be satisfied, and that cases of failure are due to the inability of particular employes with reassignment of complaints as the solution. This mental attitude will produce results in many cases which seems hopeless at the start.

Modern competitive businesses have been forced to adopt many practices which a monopoly would ordinarily have no cause to copy; but as the public becomes accustomed to the new order, they naturally compare the gas company with other business houses, and if it suffers by comparison the result is harmful. In merchandising, service, credit, and adjustment practice, gas utilities will be forced to keep abreast of times or suffer complaints with attendant loss of good-will.

Personal Calls

To avoid the appearance of handling complaints in a perfunctory routine manner, some gas companies now insist that personal calls be made on each and every complaint. Close personal contact gives opportunity to get the customer's viewpoint essential to speedy and satisfactory settlement of differences. This plan also serves to convince the customer that the company does have his interest at heart and is eager to meet him more than half way. Such calls also provide a contact which furnishes a medium for informing users concerning the company and its service.

The practice of keeping records of complaints is rather general even where not required by utility commissions. Too often no use is made of these statistics. Weekly or monthly summaries, classified as to nature or cause, provide an excellent index of the service customers are receiving. Upward trends in any class call for thorough investigation to discover the causes so that they may be eliminated before further unsatisfactory results. Do not just keep complaint records—use them.

High Bills

High bill complaints are the most numerous. Seasonal use accounts for many increases but the customer notes the increase and registers a protest. Some companies have copied the practice of the electric companies to inclose a notice with bills going out just prior to the season of increasing use, reminding customers that increases might be expected and why. Here is an idea which might answer many inquiries before they become complaints.

The gas industry is making rapid strides in improving its position in the public mind. This, in no small measure, may be improved by intelligent practice applied to complaint handling. It would truly be a great thing if all the many cases of discontent which never reach a company could be uncovered. Since this is impossible every care must be exercised in handling those received, and the information thus gained used to remedy conditions which engender ill-will toward a company.

Professional Attitude Needed

We have been given a trusteeship to perform. We are not running a business in which the ordinary rules and codes of ethics apply. We are entrusted with the administration of a business unique in its weight of social responsibility and we must not become enmeshed in our material and physical activities to the extent that we lose our sense of poise and our sense of spiritual values. In short, we must, to the extent that our capabilities permit, adopt the professional motive which will lift us above the purely material conception of our industry's place in the scheme of things and give us the perspective necessary to view the industry in its truly social aspect. —*Charles S. Ruffner, Empire State Gas & Electric Assn.*

II—Manufactured and Natural Gas

THE PRECEDING article 1—"Competitive Fuels" discussed the important properties of coal, oil and electricity from the standpoint of natural distribution, physical and chemical properties, storage and handling, utilization problems and fuel and labor costs.

This article is concerned with a similar analysis of gaseous fuels, commonly called "city gas."

City Gas

1—Distribution.

A. Manufactured Gas. Manufactured Gas is made and distributed in each of the 48 states, greatest in those with the larger city population but with the tendency (following the success of long distance natural gas distribution) of serving all the small communities adjacent to the cities.

B. Natural Gas. Natural Gas was produced in 1927 by utility company wells in 23 states and sold in 24. By the end of 1929, if present plans are carried out parts of at least two other states may also have natural gas available.

It is difficult to estimate the original supplies of natural gas. The wasteful methods of production and utilization used for so many years have for the most part been overcome and better advantage taken of this fuel, making for conservation of the present and future fields. Manufactured gas plants are being installed near fields which may become exhausted, to protect the supply as long as possible. In this way a mixed gas with a heating value between the two is being served.

Bottled natural or modified natural gas is being sold by dealers in many sections of the country where city gas is not yet available. The control of such business by a near-by gas utility should be considered seriously as a good will builder preparing the way for the day when the gas utility plans to extend its service to these districts.

2—Physical and Chemical Properties.

A. *Composition.* 1. Manufactured Gas. The composition of gas for fuel purposes varies with the process of manufacture and the origin of coals used in its manufacture. The origin of coals used (after the initial selection from beds of great reserve has been made) has very little effect as coals are blended to give desirable manufacturing properties, high gas yield and firm coke. A fair analysis of a city gas made of a mixture of coal or coke oven gas and carburetted water gas is approximately 40% hydrogen, 24% carbon monoxide, 18% methane, 6% illuminants, (benzene, ethylene) and the 12% remaining, inerts oxygen, carbon dioxide and nitrogen. Considerable variation is found according to the process of manufacture between the limits of a straight coal gas of 47.5% H_2 8.5% CO, 27.0% methane, 4% illuminants with 13% inerts and a straight water gas of 32.0% H_2, 32.5% CO, 13.5% methane, 9% illuminants and 14% inerts. In many gases, the inerts are considerably above or below these values.

State regulations are very strict on the quantities of obnoxious products present. The quantity of sulphur allowable in many states is 30 grains per 100 cu. ft. and of ammonia 5 grains per 100 cu. ft.

To insure adherence to these regulations and to the standard analysis set up by the gas utility, two different rules are closely followed. The first is the use of coals with a minimum of sulphur, ash and other impurities. The second is careful attention to purifying boxes, etc. The average amount of sulphur present in all coal used by a utility company over a long period of years can easily be lower than ¾ of 1%. In fact, the coal used for gas making is of higher quality than that usually used for domestic purposes. The purifying trains, always in duplicate, remove up to the last trace of any objectionable products before the gas goes to the holders and customers.

2. Natural Gas. Natural gas consists almost entirely of mixtures of saturated hydrocarbons, with slight quantities of carbon dioxide, oxygen and nitrogen. Usually the methane content is between 75% and 97% with ethane from 0 to 25%. There are fields, however, with as much as 50% of ethane, the remainder being methane. Most natural gases are "wet," i.e. contain higher hydrocarbons which are extracted and used in gasoline blends. Of the 1,445,000,000,000 cubic feet of natural gas produced in 1927, 93% was treated for natural gasoline with a production of 1,641,144,000 gallons or roughly 1¼ gallons per 1000 cubic feet treated. Most of the natural gas is "sweet" and needs no purification to eliminate sulphur compounds. "Sour" gases are treated in a similar way to manufactured gas to remove sulphur compounds.

3. Bottled Gas. These products are of two types, those which are gases at atmospheric temperature and pressure and those which are liquids under normal conditions but are gases at temperatures slightly above atmospheric. To provide a portable supply of a gaseous fuel means using a substance of high heating value which can be compressed and liquefied to the compactest volume at fairly moderate pressures. The usual manufactured gas or normal natural gas because of their comparatively low heating values and high liquefaction pressures are unsuitable for portable installations. The higher hydrocarbons, propane, butane, pentane, etc. however, have the desired properties, and because of the

variance among them, two types of bottled gas have arisen. The first are made up of permanent gases, propane and butane, the second of liquids, pentane. The first type are contained in heavy pressure type cylinders to keep them liquid until released for use through the reducing valve train. The second type being liquids are contained in light pressure tanks only to prevent ex-

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Annual Sales of Gas

cessive evaporation. This type consists of the so-called "casing head gasoline" and is the fraction or portion which makes a gasoline "wild" giving great power and speed to a car using such a fuel.

B. Heating Value. 1. Manufactured Gas. The heating value of manufactured gas varies according to locality from 450 B.T.U. to 650 B.T.U., the majority being between 500 and 550 B.T.U. per cubic foot. Blue water gas used only for industrial purposes has a heating value of 293 B.T.U., with limits of 280 to 310. Other industrial and by-product gases, are producer gas, 125 to 160 B.T.U. per cubic foot and blast furnace gas, 60 to 95 B.T.U. Oil gas is very similar to coal gas in heating value.

2. Natural Gas. A normal natural gas with a high percentage of methane has a heating value of approximately 1050 B.T.U. per cubic foot. With a high ethane content, the heating value is as high as 1500 B.T.U. per cubic foot. The heating value of mixed natural and manufactured gas is usually 850 B.T.U. per cubic foot.

3. Bottled Gas. The heating value of propane is about 2500 B.T.U. per cubic foot of gas and 3200 B.T.U. per cubic foot of butane gas. The heating value of the liquid bottled gas is about 110,000 B.T.U. per gallon. This value is given in this way as it is necessary to heat the liquid before combustion as a gas.

C. Combustion. A mixture of gas and air in definite proportions to give complete combustion is simple to produce and maintain as the air and gas molecules are in intimate contact and combustion is immediate. The products resulting from combustion in domestic appliances are CO_2, N_2, water vapor, slight excess of oxygen and CO well below the established maximum (which itself is very safe) of 400 parts per million. All these products are gases.

D. Gravity. All gases have a definite weight which is very light compared with common substances such as sugar, coal, etc. The weight of the column of air pressing down on every square inch of the earth's surface (called atmospheric pressure) is 14.7 lbs. Fuel gases are all lighter than air and readily ascend. Because of their lightness and the difficulty of weighing, it is usual to use the term specific gravity or "gravity" instead of weight for gases. Gravity signifies the relative weight of equal volumes of the gas and air. After the weights of gas and air have been determined, temperature and pressure changes affect all gases alike so that the gravity is always constant. The gravities of the different fuel gases follow:

Coke Oven Gas	.38 to .45
Carburetted Water Gas	.62 to .65
Mixed Manufactured Gas	.55 to .60
Natural Gas	.60 to .68
Propane and Butane (Bottled Gas)	about 1.0

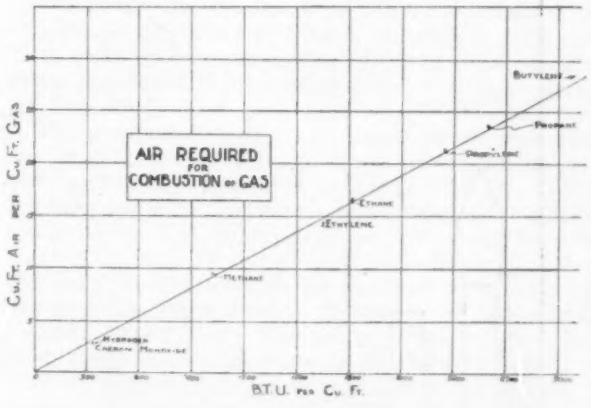
3—Storage and Handling.

A. City Gas. Natural and manufactured gases are piped directly from the gas holders and distributed through solid pipe to the appliances.

B. Bottled Gas. These gases are delivered by the supply dealer to the cabinets or tanks prepared for them and connected ready for the customers' use.

4—Utilization Problems.

A. Combustion. Combustion of gas takes place in two stages, according to the usually accepted theories. The first stage consists of the combustion of hydrocar-



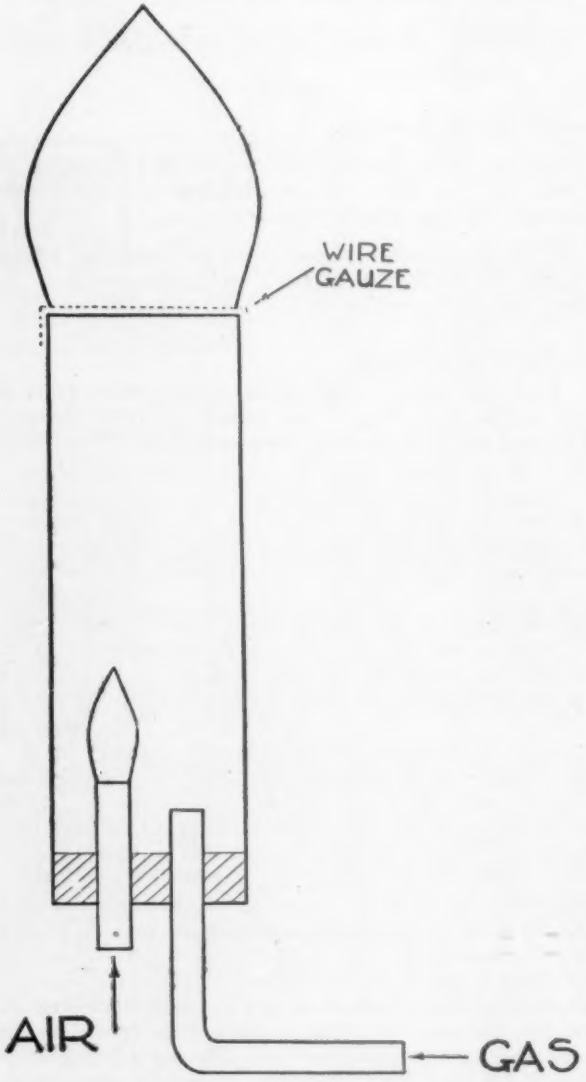
Gas Combustion Chart

bons of the gas to carbon monoxide and carbon dioxide and the hydrogen to water vapor. This results in the inner cone of light green or blue. The second stage consists of the complete combustion of carbon monoxide to the dioxide which produces the almost colorless outer cone. It is essential that the two cones be allowed to fully develop before the flame impinges on or strikes any surface which might act to cool the flame.

The combustion of gas requires air the same as all other fuels for combustion. In the domestic appliance the air is supplied at two points. As the gas issues from the orifice of the gas way, its pressure draws a certain amount of air along with it into the mixing tube. This primary air is about half the amount needed for complete combustion of the gas and the mixture so formed is not combustible. As this mixture leaves the burner port a further supply of air is available from

that around these ports. This secondary air in a properly designed appliance is sufficient to bring about the complete combustion of gas. It can be readily seen that gas alone does not burn, but that only a complete mixture of air and gas burns. A sketch is given showing how it is possible to apparently "burn" air in gas and then "burn" gas in air. It might be worth while for you to have some one in your company to demonstrate this experiment for you.

There is also a peculiar relation between the total amount of air needed for combustion of a gas and the heating value of the gas. It is found that for rough



Apparatus for burning air in gas

estimates, the amount of air needed for a given amount of gas is equal to the B.T.U. value minus 50 and the result divided by 100. To express it in a formula—

$$\text{Parts Air} = \frac{\text{B.T.U. of gas} - 50}{100}$$

For a 540 B.T.U. gas, the air needed is found to be

$$\text{Parts Air} = \frac{540 - 50}{100} \text{ or 4.9 air to 1 gas.}$$

or for a 1050 B.T.U. gas—

$$\frac{1050 - 50}{100} = 10 \text{ air to 1 gas.}$$

If the actual amounts of air needed for a few different gases are determined accurately and plotted against the heating value the chart shows the exact amounts of air needed for a gas of any heating value.

The products of combustion are gases and readily pass off. Products are given off by materials being heated which are often mistakenly charged against gas. The water vapor in products prevents a "bone dry" condition in an oven and brings about better finished products because of the much slower drying out of the materials being heated.

B. Auxiliary Equipment. The flow of gas through the piping and orifices being uniform, temperature controls are applied with greatest success to all types of gas burning appliances.

C. Bottled Gas. The second type of bottled gas requires heat to gasify the volatile liquid. The burners ordinarily used are therefore modified to permit some of the flame to heat the incoming liquid, changing it to a gas before combustion.

5—Fuel and Labor Costs.

A. Fuel Costs. With an average domestic rate of $1.00 per 1000 cubic feet for 540 B.T.U. gas, the cost of 1,000,000 B.T.U. is $1.85. At 60 cents per 1000 cubic feet of 1050 B.T.U. gas, the cost of 1,000,000 B.T.U. is a trifle over 57 cents.

Bottled gas at $14.00 per cylinder equivalent to almost 6000 cubic feet of 540 B.T.U. gas costs $4.44 per million B.T.U.

B. Labor. The labor attached to gas appliances consists only of that needed to handle the materials being heated. Time, temperature and safety controls bring about better resulting products with gas heat.

Comparison of Fuels

From the analyses in the current and preceding articles, little doubt can exist that gas offers by far the best fuel for domestic purposes.

The bald analysis of fuel characteristics, however, would be meaningless without pointing out how these properties affect the domestic use of fuel. Coal is the most widely used fuel, but the highest grade of coal, anthracite, is available to only a small portion of the fuel users. West of the Allegheny Mountains the use of anthracite is a rarity, as the competitive prices of the lower grades of coal in other sections make its use almost prohibitive. The result is that the greater number of the people use a fuel which varies from lot to lot, gives much smoke and dirt and burns exceedingly fast. Oven cooking requires uniform temperatures, to obtain which the coal fire is allowed to burn fast and then die down, but not out. In this way baking or roasting is carried on by stored heat and at a declining temperature. If the fire goes down too far, and refiring is necessary, the supervision of the cooking becomes serious. It is quite difficult also to do top cooking requiring a fast fire and baking at the same time. Obviously a fuel which is shoveled in, then burns rapidly and finally slows down cannot be thermostatically controlled.

The storage of anthracite and bituminous coal in cellars is not serious, although for yard storage, definite

methods of piling and ventilating must be used to prevent spontaneous combustion. The cellar storage of the lower grade coals is very difficult as the lumps of these disintegrate rapidly becoming a fine impalpable dust. These coals cannot be stored for over 3 weeks without total disintegration. In either case, coal must be carried from the bin to the stove or furnace. The dust quickly smudges up kitchen walls, floors and ceilings. The labor and dust from ash removal are well known.

Need of Chimney

All coal burning appliances must be connected to a properly constructed chimney, not only to remove smoke and fumes, but also to create a draft to introduce air for combustion of the fuel. Kindling paper and wood are needed for starting the fire.

The cost of coal varies according to locality and grade and size. The desirability of comparatively low volatile (smoke forming constituents) and ash contents as well as the few sources of supply, make the higher cost of anthracite worth while. Bituminous coal because of its wider distribution and greater amount of smoke produced, brings a price about ⅓ lower than the same size anthracite. For example, the relative prices between the two is $15. and $10. The smaller sizes of anthracite which are suitable for steam raising and industrial uses sells also at a much lower price than the larger domestic sizes. In many sections of the country where sub-bituminous coals occur, this sells for from $1.50 to $2.50 per ton plus delivery costs. Such a difference more than makes up for its inconveniences.

The continued use of coal then depends on the relation between its advantageous price and disadvantageous utilization, as the supply is practically untouched.

The case of oil in many respects is similar to that of coal, except that the naturally occurring crude fuel is refined before sale. Oil for domestic purposes is chiefly of one grade, kerosene or very similar fractions.

The sale and delivery of oil is carried on by tank wagons or in one gallon cans by wagons. Absolutely tight containers are needed as oil spreads in thin layers and penetrates most materials deeply. Unless care is taken the volatility of oil particularly after spreading creates a serious fire hazard.

Oil Must Be Gasified

Before conversion to heat, oil must be gasified. In many appliances, the radiant and conducted heat of the flame is sufficient to gasify the oil drawn by the wick or by gravity from the reservoir. This requires an appreciable time before the flame is high enough for cooking use and with the gradually increasing heat, the flame must be adjusted often until a steady condition results. Wicks to be in good condition require cleaning, depending on the time used from onse daily to once weekly. This consists of wiping away the consumed wick with a cloth. When burning at low rates, air for combustion is either insufficient in amount of improperly mixed, with resulting smoke, oily deposits and odor. For house heating, oil is gasified by auxiliary heat or mechanical dispersion. Oil pumps are used for delivery to the burners and blowers to supply air for combustion. Furnace oil is usually of a kerosene grade, either not as completely refined or colored to create a new type.

smoke, oily deposits and odor. For house heating, oil is gasified by auxiliary heat or mechanical dispersion. Oil pumps are used for delivery to the burners and blowers to supply air for combustion. Furnace oil is usually of a kerosene grade, either not as completely refined or colored to create a new type.

To localize the effects of incomplete combustion, dirty wicks or over-running flames, oil cooking stoves should be placed under a flue connected canopy. House heating boilers using oil must be flue connected to eliminate smoke and fumes and to provide air for combustion of atmospheric type burners.

The cost of oil varies with proximity to oil field and refinery and season. With an off season for gasoline, kerosene prices fall. The usual price in eastern cities is 21 cents per gallon and 15 to 17 cents in 50 gallon lots. The price of furnace oil depends also on locality and competition, not only between fields, but also between supply dealers. The usual contract price for domestic house heating varies from 8 cents to 11 cents per gallon.

Oil, Intermediate Step

Oil is an intermediate step from the crude fuel, coal to the refined fuel, gas. Some of the drawbacks of coal are eliminated. Oil has a constant composition, it flows steadily to the burner, it burns when carefully used without much smoke or odor, produces no ash, but lacks the simplicity of gas, its dependability and ease of control. Its cost is the same or greater than gas without the advantages.

The future of oil depends not only on the available supply, but also the needs for motors. The constant increase in the use of gasoline has made vast changes in refinery practice. Twenty years ago, kerosene and naptha methods for breaking down the kerosene and cracking methods for breaking down the kerosene and heavier fractions are constantly developed. The ultimate seems to be a conversion of crude oil to two fractions, gasoline and lubricating oils. The fuel oils will be eliminated.

The greatest advantage of electricity as a domestic source of heat results from its use in the smaller portable appliances, irons, toasters, percolators, etc. Its use for larger heating operations, however, is quite a different matter. The quantity of heat required from the smaller portable appliances can easily be supplies from the lamp sockets through an ordinary cord. An iron, for example, has a heating element using 600 watts or roughly 2000 B.T.U. The top burner of a stove, however, needs over 1500 watts or roughtly 5100 B T. U. Such a burner alone is the equivalent of a 2 H. P. motor. An industrial wiring installation must be made for a usual kitchen range. Even with this heating capacity, the cooking is much slower than gas cooking. Thermostatic control for electricity is difficult. Heat is produced by the resistance of a metallic ribbon to the current, which must be flowing to produce heat and turned off to cool. Consequently, to obtain thermostatic control, the current must be "all on" or "all off," which means alternate periods of overheating and underheating. Like a stopped clock, which is right twice a day, the temperature is right in between the under and overheating. By splitting the heavy elements, a manual control of Low, Medium and High can be produced.

Electric ranges should be flue connected to provide oven circulation and remove the products from the foods being heated. All electric ranges have flue connections provided.

The cost of operation is perhaps the greatest drawback of electric cooking. With the manufactured gas at $1.00 per M cu. ft. and considering the efficiencies of utilization, electricity must sell for 1 cent per K.W.H.

to give equal operating costs. The demand charge for a range makes such a rate unusual.

The future of electricity as a source of domestic heat depends on many factors. The present methods of manufacture must be radically improved. The best possible efficiency at the burner based on amount of coal used is not over 18%. Another essential is the building up of off peak electric business. The present load is a daylight load. Cooking is carried out during that period and the greatest amount just at the time when both the end of the daylight power load and night-time load overlap. The use of hydroelectric power must be confined to a limited area. The line losses in transmitting high tension power are very great and such losses in a 300 mile line are far greater than the "unaccounted for" gas in a system of far greater length.

Merely to assume that gas is the ideal fuel because of the deficiencies of other fuels would be idle boasting. Gas needs no adherents because of deficiencies of competitive fuels. It has all the advantages of the others and some in addition.

The composition of gas is one of purity. No dust, dirt or objectionable substances are present and with modern appliances none should result, except through sheer neglect or utter carelessness.

The heating value of gases are sufficient to permit of simple design for speed and at the same time, a great degree of turn down to allow for the slowest simmer. Gas being supplied through solid connections, all storage and handling is eliminated and heat commences at the turn of the gas cock. The rate of heating always remains constant unless manually or automatically changed.

The gravity of fuel gases is heavy enough to induce enough primary air to produce a non-combustible mixture, and yet, combustible with the required secondary air. Gas appliances must be open to the atmosphere to remove the flue products which do not support combustion. In some cases connection to a flue is desirable to remove large volumes of flue products.

Gas is delivered to the mixers through a definite size orifice or gas way, which limits the amount of gas passing. The result is always a constant ratio of air to gas giving the most efficient heat production. The control of gas flow by automatic controls is simple as the gas flow can be gradually changed to agree with oven temperatures. A throttling or graduated control always holds the desired temperature with no variation.

The fuel costs are from the standpoint of utilization, not higher than any other fuel, which added to the other advantages, make gas the logical and ideal domestic fuel.

Future of Gas in Home

The future of gas as a domestic fuel is indeed promising. The era just passing was one of railroad development and progress. The era just starting will be one of gas development and success. The groundwork of local plants and street mains is well laid. The near future will see the plants interconnected with high pressure lines delivering to street main centers. The result will be as startling as the assembly of over 600 companies into the Pennsylvania Railroad. Better methods of manufacture and purification will be developed. It may even be that gas manufacture and distribution will be only part of a gigantic chemical plant which will make use of the summer slump in gas use for the production of many products such as the various alcohols. Methyl Alcohol is the theoretical result of the chemical action of a balanced blue water gas. Ethyl Alcohol has been made from ethylene, one of the illuminants in manufactured gas. Because of the greater quantity of hydrocarbons in natural gas, much more thorough investigation has been made into the chemical reactions and many interesting new compounds have been produced. Among these may be mentioned anti-freeze liquids, new solvents and medicinal compounds.

The gas holder, which is the balance wheel of the manufacturing plant, must not be taken as the symbol of the industry. It serves to assure the customer of proper gas supply under all conditions, but as a symbol is an indication of the storage desire, rather than the activity which should move every sales persons to more and better applications of gas.

Having considered the various characteristics of the different fuels, the next article will deal with "Comparative Costs," including a summary of the Principles of Gas Rate Structure and cost relations based on actual comparative tests.

Use of Low-Temperature Coke in Powdered-Fuel Furnaces

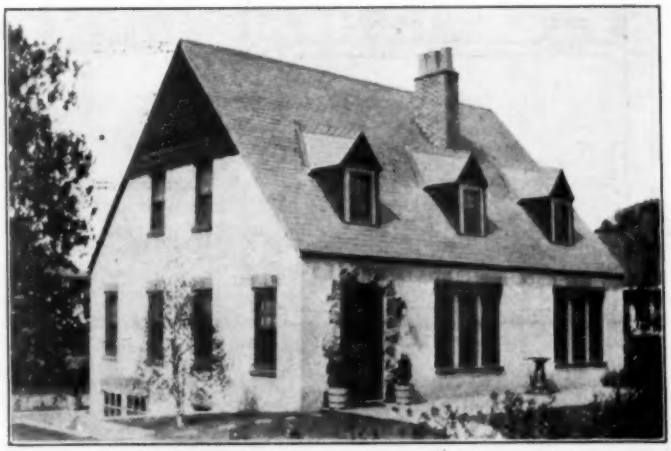
The distillation of coal produces a variety of useful products. First, it produces the coke which is essential to most metallurgical processes. Second, much of the gas used for city distribution comes from the distillation of coal. Finally, oils, tars, disinfectants, wood preservatives, and ammonia are produced. The early processes, still largely used, subjected the coal to a very high temperature which is conducive to large gas yields and a strong coke much to be desired for metallurgical uses. Lately, however, it has been found that distillation or carbonization of the coal at lower temperatures results in a larger and in some ways more valuable yield of oils and tars, and a coke which is more readily ignited than metallurgical coke and is therefore more suitable as a fuel for house and other heating furnaces. Furthermore, the low-temperature coke has the advantage over soft coal in that it is practically smokeless Since the low-temperature coke is not as strong as metallurgical coke and is therefore less readily obtained in lump form, a logical use for some of it would be powdered-fuel burning installations which, in the case of coal, are rapidly coming into use in power plants.

The question of the relative value of powdered low-temperature coke as compared with coal, the usual fuel for heating and power boilers, has been investigated at the Pittsburgh Experiment Station of the United States Bureau of Mines, Department of Commerce. It has been found that the rate at which a flame travels through a cloud of low-temperature coke dust is, to be sure, less than for coal dust. The rate is, however, still rapid enough to permit ready ignition of the coke dust in a furnace. A further investigation was directed toward determining the relative rates at which particles of coke dust and coal dust burn after once having been ignited, for this will determine the rate at which the burning particles will liberate heat in the furnace. It was found that the rate of burning of the low-temperature coke particles is quite comparable with that for coal under similar conditions. It was shown that the powdered low-temperature coke has a definite advantage over powdered coal in that the former is much less liable to spontaneous ignition than the latter, and can probably be stored with safety.

An Economically Heated Home

How insulation enabled the home owner to keep the gas bill at a surprising minimum

By Henry M. Riley
Editor, American Gas Journal



IT should be well recognized by the House Heating Department of a gas company that a knowledge of house construction, at least where insulation has been employed, is quite as essential as being conversant with gas-fired furnaces and their characteristics in operation. Those who plan along these lines will obviously reap a full measure of success in furthering the sale of gas house heating.

The electrical industry has rigorously demanded that its lighting engineers not only know their lighting medium but also the conditions under which the illumination is to be used and it shows a dogged keenness in thoroughly studying any factor that might have even a small bearing on the subject. In turn, it is recommended that the gas house heating man keep on the alert for any new form of building construction that would seem to make the selling of his particular fuel for heating easier.

Construction Features

In Ridgewood, N. J., there was completed, as of October, 1928, a house of rather unusual construction. This home which was designed, erected and occupied by R. C. McWane, a Mechanical Engineer, really had its inception in the desire for a gas-heated residence. As a matter of fact, so successful was Mr. McWane in carrying out his original plan that the obtaining of a patent on the special method of construction was the ultimate outcome.

Briefly, the construction procedure consists in pouring concrete into special steel forms to form the walls. As shown in Figure 2, steel ties, A, which remain in the walls after the forms have been removed, assist in holding corkboard, C, in a central position and also act as reinforcing members. At regular intervals along the corkboard, metal projections are disposed so that when the concrete is poured there obtains a wall of ten inches thickness, the same consisting of a layer of concrete, 3 and ½ inches thick, one inch of air space, one inch of corkboard, another inch of air space, and finally an additional 3 and ½ inches thickness of concrete. Incidentally, the steel forms can be used at various places as the concrete hardens and the work progresses.

Moving into his new home in November, 1928, Mr. McWane at once lighted the gas furnace which remained under fire, intermittently of course, depending on the action of the thermostat, for the entire heating season.

Boiler Data

Before tabulating the success of such a constructed home when using gas for heating it would be well to set forth those data which will be of immediate interest to the gas house-heating engineer.

Size of gas boiler	OG5 Ideal, 340 sq. ft. A.G.A. rating
Thermostat	With electric motor
Smoke pipe	Galvanized iron, 5 inches diameter
Chimney	Tile lining
Safety and regulating features on boiler	Thermostatic pilot; low water cut-out; Arco steam regulator; Pop safety valve; draft diverter; throttling valve.
Window area ..(double paned)..	300 sq. ft.
Square feet of radiation	187

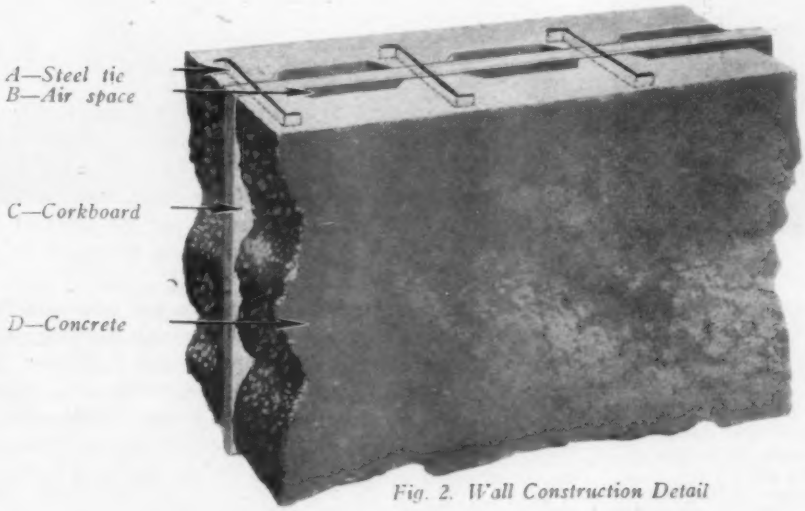


Fig. 2. Wall Construction Detail

The curves, shown in Figure 4, give tangible and convincing evidence that the house was economically heated and it is of further interest to know that in the heat of summer during the day time, the doors and windows of this home are kept closed in order to keep the house cool. In conclusion it might be mentioned that no

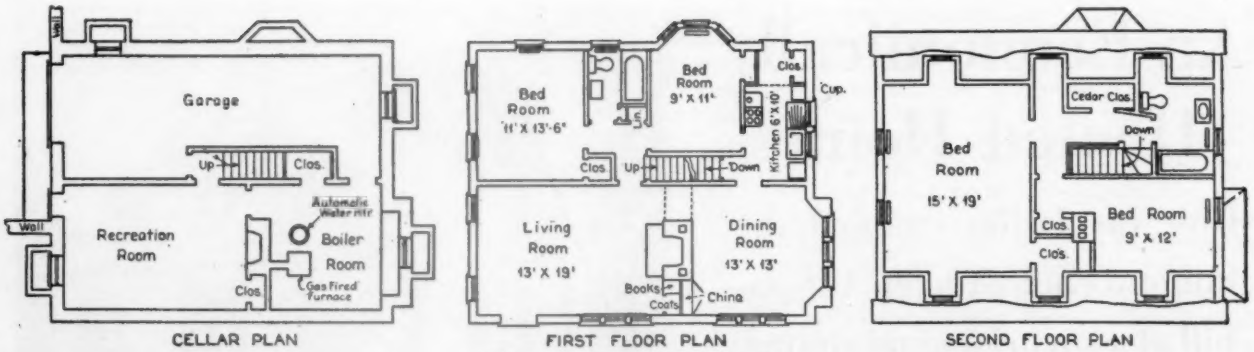


Figure 3. Plan of the House

moisture has penetrated the walls to date and the cost of construction is on a par with houses of the same relative size but not insulated.

In addition to the walls being insulated as shown the ceiling of the top floor was insulated with a special plaster lath and insulation was used on the roof joints.

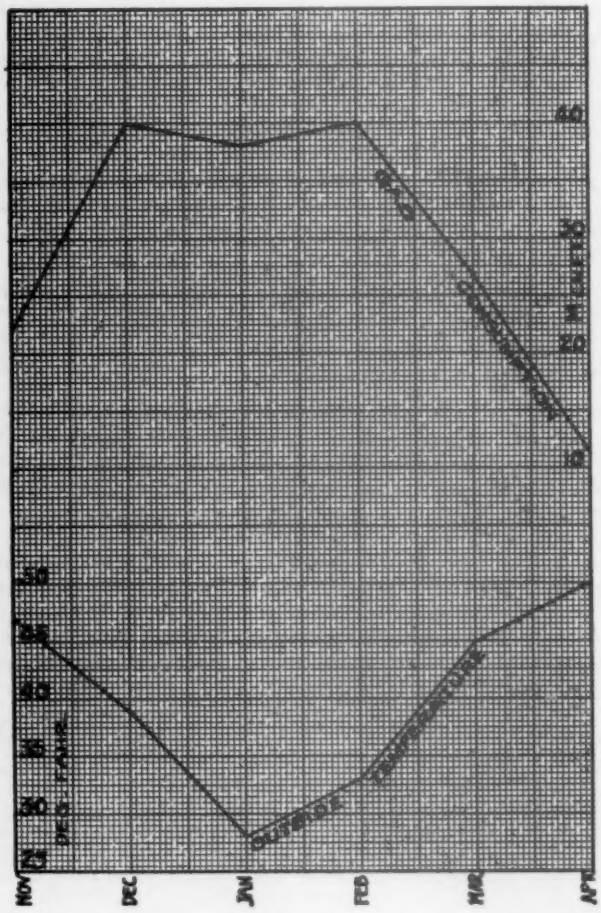


Figure 4—Temperature Gas Consumption Chart
Average temperature maintained—70 deg. F. day, 60 deg. F. night
Calorific value of gas—525 B. T. U. per cu. ft.
Average rate per M cu. ft.—96 cents.
Gas pressure—32 tenths.
Note—During the months of December and February considerable opening of front and back doors was in evidence due to workmen going in and out.
The gas consumption shown on the graph include house heating, cooking and water heating. (Four in the family.)

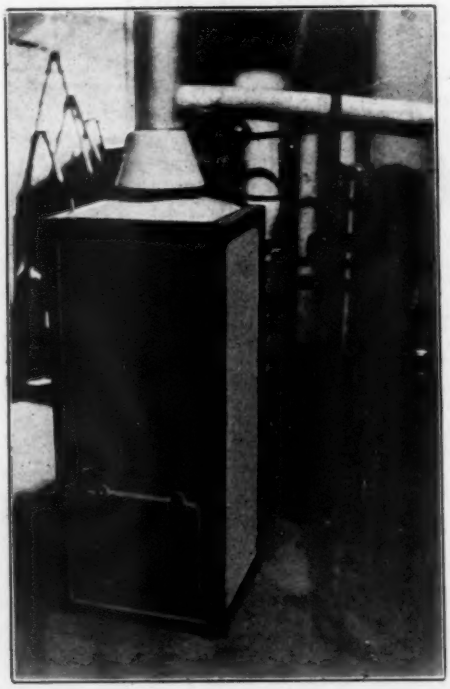


Figure 5. Gas-fired Heating Unit

Types of Compressor Units

The prime mover of the modern [natural gas] plant is the direct-connected, gas-driven compressor unit, ranging in sizes of from 80 to 1000 B. H. P. each. In smaller plants, up to 3000 total horse power, units of 200 H. P. or less are preferred, while the units of 500 to 1000 B.H.P. are found the most practical in the larger plants of more than 3000 H.P.

The compressors for this service are now generally equipped with automatic plate type valves rather than poppet or corliss mechanically operated types. The plate valve has advantages over other types in that it provides greater relative valve area with increased volumetric efficiency and more satisfactory operation at higher compressor speeds because of the extreme lightness of the moving parts.

—Compressor Station Committee Pacific Coast Assoc., 1929.

Saving Steam Plant Expense by Shooting Baffles

By Special Correspondent

THE boiler plant of a gas works offers many opportunities for effecting savings providing one knows how to cut corners. In this connection judicious repair procedure will ofttimes indefinitely postpone the purchase of parts and accessories of relatively high cost. In the following case a very tangible saving was effected by "shooting" new monolithic baffles instead of replacing the old tile ones.

Stack temperatures averaging 600° clearly showed a leaky condition of the baffles in the battery of 250 HP. Edge Moor boilers and on examining these tile baffles which had been in service for some years, it was found that an entire new baffle job was necessary for both front and rear.

The estimate for replacing baffles in three of these boilers amounted to $1200, but it was thought that this figure could be beaten by building monolithic baffles with the boiler room's own crew. There was in the plant a refractory gun originally ordered on trial for furnace wall and arch repairs and patches. It worked out so successfully in this capacity that it was thought baffles could be built with it by using a wood lattice form and

Workmen preparing gun equipment for use

shooting a plastic mixture directly against the form.

The service engineer of the company who manufactured the gun was called in and he advised that the plan was feasible. He demonstrated the gun for this purpose on the first monolithic baffle built.

The procedure was as follows: Wood 2" x 4" stringers were laid across the tubes to support the lattice work of 1 x 1⅝" slats, which were placed diagonally down each lane between the tubes, with crossed diagonal slats down each lane from the opposite direction. These slats were fastened to the stringers across the top and beneath the bank of tubes. In this manner the forms for front and rear baffles of three of the boilers—six baffles in all—were built.

Material Used

The quantity of material required for the six baffles was as follows:

Dry Refractory Material	4200 lbs.
Hytempite	3200 lbs.
Portland Cement	1 bag

The High Temperature Cement was first diluted with water, bringing it to the consistency of a creamy batter; then the dry Refractory material was added a little

Gun equipment in use; one man in boiler

at a time, all being mixed very thoroughly. When about ready to apply the mixture with the Refractory Gun, a small amount of Portland Cement was added to aid the initial set.

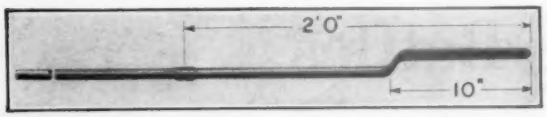
This plastic mixture was made in several batches so the material would be always in a sufficiently moist condition. The nature of the mixture was somewhat stiffer than mortar and was handled very nicely when being applied with the gun.

Application

Commencing at the bridge wall the mixture was shot from the gun against the lattice work using at first a short nozzle. This nozzle as the work progressed was extended with sections of ¾" pipe.

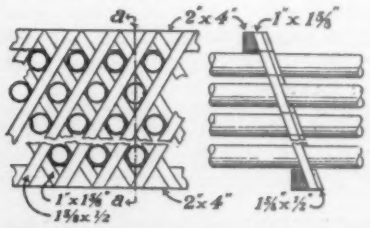
After applying the material it was tamped with a special tool made of ½" pipe, as shown in the illustration. With this tool one could not only tamp and smooth the surfaces of the baffle, but by turning it on edge could work the material snugly in around the tubes.

The baffle was not built to full thickness in one application but the work was alternated between front and



Special tamping tool

rear baffle giving each successive layer an opportunity to dry out slightly and set before applying the next layer. A slow fire was started soon after the baffles were completed, to dry them out and about eight hours later the boiler was raised to the steaming temperature. The wooden lattice was left in place and allowed to burn away.



Detail of form construction for baffles

The speed of application was surprising and it was found that a good job had been made at very low cost.

Cost Data

The figure on the cost of front and rear baffles for three boilers was as follows:

7400 lbs. Refractory Mixtures (Hytempite & Crushed Fire Brick)	$226.70
1 bag of Portland Cement @ .70	.70
200 ft. of lumber @ 12.00 per C.	24.00
55 hrs. labor @ 1.00	55.00
55 hrs. labor @ .62	34.10

This makes a total cost for material and labor for the six baffles of $340.50.

The difference between this and the estimate on tile baffles paid for the gun on the one job and still left a margin of $234.50.

The new monolithic baffles as now installed are gas tight and enable the plant to operate on an average of 135% of rating over 24 hours with peaks as high as 180% in these hand fired boilers. It also brought the average stack temperature down to 495° F. at this rating with 560° at the peaks, which indicated a good, tight baffling job that has effected a considerable saving of fuel.

The Ideal Generator Refractory

The question of just what grade of fire brick is best suited for a checker brick in an oil gas generator, is one of great importance to the oil gas industry. The best suited firebrick for a checker brick is a fire brick that will absorb and store up heat and liberate it over a period of time to conform to the most efficient oil gas operation. The best suited fire brick for generator shell lining is a brick that is slow to absorb heat, that will serve as an insulating medium and has a very low conductivity. We should not use the same grade of fire brick in the two courses of generator shell lining. The inner course should be composed of a fire brick having all the characteristics of a first grade checker brick, owing to the fact that the inner exposed surface will suffice for liberating and absorbing heat as well as the checker brick body. The outer course of generator shell lining should be composed of a fire brick which has more insulating qualities and of very low thermal conductivity. It should also have a very low co-efficient of expansion and one that the heat will not radiate through in order to properly serve as an insulation medium.—*Refractory Committee R. C. G. A.*

The Relative Accuracy of Orifice and Displacement Meters

A choice between orifice and displacement meters must involve a decision concerning the relative accuracy of these two types of meter.

Orifice meters have been and still are the subject of a great deal of research work, as a result of which many improvements have been made in their accuracy. Under favorable operating conditions an orifice meter installed in accordance with recognized standards can be depended upon to give results accurate to within 1 or 1½%. Unfavorable conditions may introduce larger errors. Some of the more common causes of error in orifice meter measurements are:

1. Rapidly fluctuating rates of flow.
2. Pulsating flow.
3. Low rates of flow through meter designed to high rates of flow.
4. Entrained liquids.
5. Fluctuating gas gravity.

Many of the errors resulting from these causes can be eliminated or diminished by the use of automatic valves or instruments. However, such devices increase the cost of measurement and are to be avoided if some other means of obtaining accurate measurements is available.

Measurements made in the past with displacement meters have frequently been in error and as a result this type of meter has often been discredited. Common sources of error in meters of this type are:

1. Meter overloaded.
2. Dirty gas.
3. variable static pressure.
4. Obsolete type of meter.
5. Inaccurate testing.

Dirty gas cannot be measured with displacement meters. If the dirt cannot be removed from the gas before it reaches the meter, an orifice meter can be used to obtain an approximate figure. Sand or heavy oil, sometimes encountered in natural gas work, will render entirely inoperative, a meter of the diaphragn type, sometimes within a few hours. A meter of the liquid seal type will measure dirty gas a little better, but it also soon gives erroneous results, due to erosion of the valves or the changing of the liquid level.

Where operating conditions permit the former solution is preferable to the latter because of the operating expense involved in the use of the volumetric gage.

—*Gas Measurements Committee, P. C. G.A.*

Estimating Future Gas Consumption

How Mathematics plays an Important Role in Sales Planning

By John H. Hartog

Sales Manager, Portland, Oregon Gas and Coke Company

WHILE the New Business Department has two outstanding functions, namely, creating the demand by advertising and filling this demand by personal effort, it also has to deal with mathematics in order to guide it in its expenditure of money, mind and muscle.

The greatest amount of figuring is done in connection with the semi-annual budget on sales of merchandise and gas, and the expense to be incurred.

In making such a budget, the first thing that has to be decided upon is the number of customers we are going to lose and gain during the period under consideration. In order to have some kind of an idea as to how this tendency is running, we plot a graph showing the gain and the loss in customers over the previous three or four years. This gives us at least an idea as to how the wind is blowing and always has surprises in store. One may do a vast amount of good work and secure customers by the thousands and yet at the end of the year find business has really been standing still on account of losing customers to other fuels as fast as new customers are gained. It then becomes a question as to which is the more important—saving the old or getting the new.

The Value of a Customer

The next thing to ascertain is, what is a new customer worth, and is an old customer as valuable to keep as a new customer to get?

If customers quit faster than new ones can be added, steps have to be taken immediately to counteract such a tendency.

Once having estimated the number of customers to be added or lost during the period, it becomes a simple matter of mathematics to determine how much gas has to be manufactured and sold and how much this will produce in by-products, such as in our case especially, carbon Briquets, of which we are now selling over 50,000 tons per annum, in spite of this being a country of cheap wood and still cheaper sawdust.

The appliance sales are then estimated for the period, based to some extent on the increase in customers. The total amount of appliances to be sold is then subdivided according to their different natures and the budget is made showing how many of each kind and type have to be sold during the next twelve months. In a similar way the expense necessary to produce the above results is estimated and divided over the various months.

The amount of appliance sales and the amount of expense having been determined, it is possible to make an estimate fixing the profit or loss expected by the New Business Department in its appliance sales during the coming twelve months.

Considerable mathematics is necessary

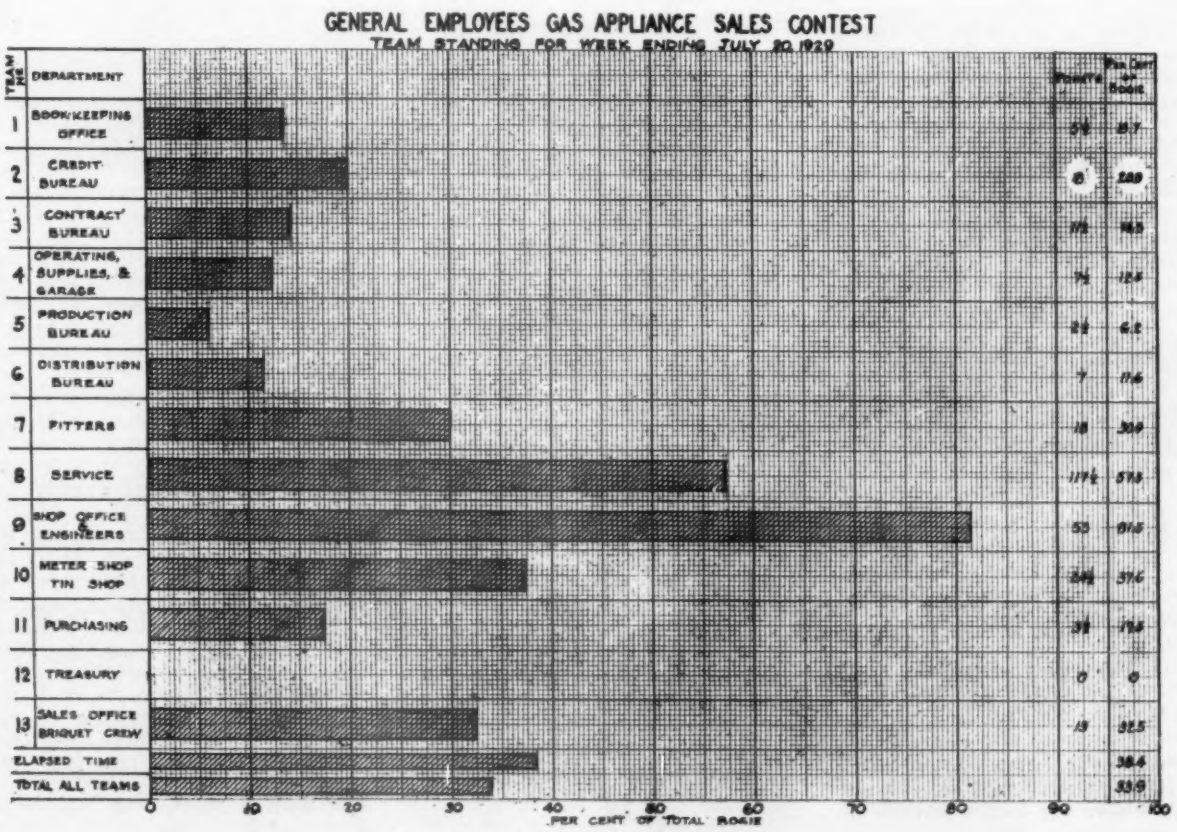


Chart showing standing of various teams

in connection with special sales and campaigns. For instance, we decided recently to have a sales contest among our General Employees, to last during the three dull summer months, in order to take up the slack and boost appliance sales.

For some years now we have followed a policy of paying General Employees for all prospects with which the salesmen could close and if an Employee makes a sale personally, then of course the commission is considerably higher, even though the sales force may have to help close the deal.

Determining Bogey

In order to determine what kind of a bogey should be given the teams into which the General Employees have been divided under their respective captains, the sales by the General Employees during the previous twelve months were considered and the total bogey arrived at was then proportioned for the various teams. In order to keep tab on the results obtained during the campaign, a chart was made to show the standing of the various teams in proportion to the bogey. The positions of the teams are compared with the percentage of time elapsed, as shown on the chart.

In order to show the relation of sales to prospects this present month, we deducted the percentage of Employees' sales and checked same to the total number of prospects turned in by General Employees.

All above are mere matters of detail, for the principal thing was a survey made up at the beginning of the year, analyzing conditions, finding the reasons for loss of customers and calling attention to the various shortcomings of the New Business methods, just exactly as an outsider would do were he engaged to criticize and point the way.

Attached to this survey we prepared ten schedules, as follows:

Schedule 1 contained the Annual Budget on Appliance sales in all their details.

Schedule 2 set forth the number of Used and Unused services, as follows:

Total Services installed
Using Gas
Houses vacant
Occupied, not using
Total not using
Assuming 75% vacant will use
Total potential users
Total remaining unused

The figures here were given in totals and in percentages.

Schedule 3 was an Analysis of New Service Installations for the four previous years, estimated for 1929 on the following:

Main Extensions
Industrial
Residences—New construction
NS—Old Houses and Unclassified
Total Gross Services
Total net services after deducting removals, etc.

Schedule 4 estimated the Distribution of New Customers and Annual Revenue in Gas consumption, as follows:

Follow-up New construction
NS and DS Canvass
Main Extensions
Architects and Builders Service
Plumbing and Heating Contractors
Follow-up New Construction
General Solicitation Pioneering and competition
Advertising and Publicity
Total New Customers
Estimated loss of Customers
Net Gain

Schedule 5 showed the customers lost and compared the ratio of services installed to the number of customers gained.

Schedule 6 showed the traffic in customers, how many at the end of each year, how many gained, how many lost and how much remained net and what we expected to do in 1929.

Schedule 7 went into detailed figures as to new customer meter sets.

Schedule 8 gave the comparison in new FR meter sets and net gain of meters and the ratio.

Schedule 9 set forth the monthly Gas consumption in cubic feet per customer and per meter and while this showed a loss in 1926, it showed a gain in 1927, also in 1928, and we estimated a still larger gain for 1929.

Schedule 10 dealt with advertising and publicity. Dividing up the total appropriation into how much we intended to spend to keep old customers, how much to get new ones and how much to increase the Gas consumption per customer. Also how much we intended to spend on each kind of appliance.

A Five Year Plan

Based on this interesting and very complete survey, a 5-year plan was worked out and submitted, showing the maximum possible revenue and the cost to secure same. These figures were based on population, vacancies, increase or decrease of population, the use of wood, oil, sawdust, etc. The discussion was divided into the following: 1, Residential and 2, Househeating.

The residential was subdivided into (a) Cooking, (b) Waterheating, (c) Laundry and other appliances and (d) Refrigeration.

Each of these subdivisions was re-subdivided, as for instance Cooking into checking electric competition, massing our man-power into shock troops, possibilities of increasing the cooking load, new homes, our old customers, how to save threatened losses and what tactics to use.

Similarly the Waterheating was subdivided into house-to-house canvass, new homes, converting tankheaters to automatics, as well as saving our very important present business.

In order to base our recommendations on dependable data we had an expert figure out what the net profit was per thousand cubic feet on Gas sold for cooking, for househeating, for waterheating, for laundering and for refrigeration.

By estimating the number of cubic feet used by each type of appliance used and multiplying the net profit per thousand cubic feet we arrived at a most interesting showing of what various appliances would produce in net Gas profit per annum. Of course washing machines were at the bottom and househeating at the top. One of the surprises secured from this analysis was that the despised, lowly hot plate ranks only a little below the aristocratic, dolled-up Gas Range and that the tankheater pays better than either of them.

With such a complete and detailed set of statistics and estimates the management has something to go by and yet things change so fast in this present day, that one has to be careful not to let figures become the master, but use them as a servant and check up from time to time to see how far the actual performance confirms the anticipation and then set sail accordingly.

Analysis of Sale of Thirty Standard Articles Shows Decided Consumer Preference

With a view to convincing grocers that they make a mistake in duplicating brands, the *Minneapolis Journal* made a canvass recently in order to learn how many brands of thirty standard articles it was necessary to stock in order to satisfy the bulk of the trade. This mass of data they then condensed into the following table:

	No. of Brands	Preferred Per Cent.	Second Per Cent.	Third Per Cent.
Tea	77	64.49	13.15	3.65
Canned fruit	112	62.43	7.74	6.03
Pancake flour	25	62.32	21.74	6.37
Canned milk	37	61.20	18.05	11.24
Cleansers	36	60.47	21.52	6.22
Laundry soap	30	60.37	19.31	16.44
Canned fish	162	57.80	6.73	3.63
Catsup	53	56.01	30.07	2.73
Baking powder	31	52.44	19.96	17.56
Cocoa	58	51.85	20.61	8.42
Washing powder	44	48.63	14.06	13.67
Packaged cheese	19	44.76	20.36	12.28
Salad dressing	38	44.20	26.72	15.29
Toilet soap	96	43.57	25.67	10.47
Wheat breakfast foods	16	41.28	25.99	18.03
Soap flakes	35	41.03	20.97	20.87
Vinegar	40	39.28	26.46	8.18
Flour	52	37.72	34.58	9.03
Salt	47	34.83	24.41	13.53
Miscellaneous cleaners	42	31.49	26.55	18.56
Mustard	110	16.75	14.42	11.13
Canned vegetables	297	16.47	10.78	10.48
Cigarettes	28	57.61	25.65	7.87
Toilet paper	313	56.34	2.05	2.05
Cigars	234	41.06	10.31	9.15
Ginger ale	46	32.52	13.16	7.92
Pipe tobacco	68	29.77	13.04	11.01
Spring waters	21	24.80	17.10	14.50
Malt syrup	51	22.41	20.73	12.50
Coffee	102	21.88	14.47	10.00

An analysis of the first item in this table—tea—shows that out of the 77

(Continued on page 75)

ABILITY TO SERVE

THE WORLD IS OUR FIELD

ABILITY TO SERVE

THE slogan above is indicative of the scope of Stacey Bros. activities. A two million cubic foot holder in Sao Paulo, Brazil, a five hundred thousand cubic foot holder and large purifier boxes in Panama, holders and other fabricated plate products in Colon, Mexico, Canada, France and Japan substantiate the statement that "THE SUN NEVER SETS ON STACEY BROS. PRODUCTS."

Our "ABILITY TO SERVE" the Gas Industry is convincingly demonstrated by the work we have done. Here we picture our ten million cubic foot holder at Long Beach, California. This is a duplicate of our ten million cubic foot holder at Buffalo, New York. Another ten million cubic foot holder is now nearing completion in San Francisco, California.

The Most economical form of High Pressure Storage and the *only type which* permits of future enlargement.

The most practical shape for permanent tightness; fabricated and erected at the least cost.

Built on established Boiler principles.

"STACEY BULLETS"

Our "STACEY BULLETS" for high pressure storage range from ten thousand to three hundred fifty thousand cubic feet capacity in a single unit.

BOOTH 639

THE STACEY BROTHERS GAS CONSTRUCTION CO.

BOOTH 641

CINCINNATI, OHIO

JAMES E. STACEY, Pres. ANDREW J. STACEY, Vice-Pres. WAYNE STACEY, Gen. Sales Mgr.
ARTHUR A. POPE, Sec. and Treas. WILLIAM A. MILLER, Chief Eng. P. C. RODGERS, Asst. Sales Mgr.

NEW YORK OFFICE—75 West Street—P. F. McEnaney, Mgr. Tel. Bowling Green 8186
New England Representative—Eastern Service Co., Boston

Presenting the Thor Agitator

with built-in gas heater

THE famous Thor Agitator—recognized and approved to be the fastest, most thorough washer of its type on the market—now offers still another vast improvement in design.

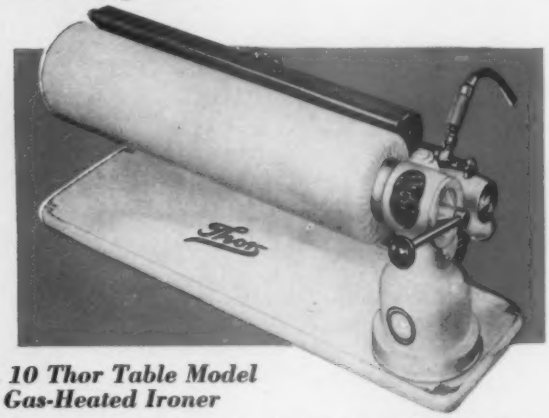
A built-in gas water heater

Fast before—it is now even faster. Efficient before—it becomes still more efficient. Everyone knows that fast, thorough clothes washing in any type washer depends *first* on water temperature.

Now by designing an efficient gas burner into the washer we've made it possible to have constantly heated water in the tub at all times. Simply fill the tub once and light the gas. No cooling off. No adding hot water. No draining off cooled water and changing to hot. The water remains at the same efficient temperature throughout the entire wash. Clothes are thoroughly cleaned faster—and the whole washing operation is speeded up as a result.

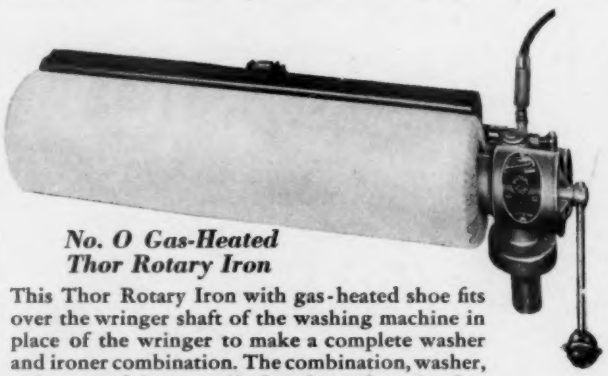
NOW—all drudgery gone

This removes the last trace of drudgery from the wash-day task—the business of fili-



No. 10 Thor Table Model Gas-Heated Ironer

This is the portable Thor Rotary Iron with gas-heated shoe that can be used on any convenient table. Has ironing surface of 10 flat-irons. With 10 minutes practice anyone can operate it. It irons everything—75% faster than hand-ironing. Presses men's trousers and women's skirts.



No. O Gas-Heated Thor Rotary Iron

This Thor Rotary Iron with gas-heated shoe fits over the wringer shaft of the washing machine in place of the wringer to make a complete washer and ironer combination. The combination, washer, wringer and ironer sells for about the price formerly asked for a good washer alone.

WORLD'S LARGEST MANUFACTURER

famous washer

ing and emptying the tub to keep water hot.

The washer itself works almost without help. It is faster than any you've seen. Tub is oven-baked porcelain enamel, inside and out. Lid is rubber guarded—made rattle-proof and splash-proof.

And it's the only washer of its type, by actual test, that thoroughly cleanses shirt cuffs and collars in one washing without soaking. Tub of generous capacity is amply large for the average family.

Gas Companies! The Thor Agitator, the Combination Washer and Ironer and the Table Model Ironer illustrated here have been the sensation of the industry in the past year. Equipped for gas heating—these famous appliances open new fields for aggressive sales development. Write us for territory allotment and franchise information.

HURLEY MACHINE COMPANY

22nd Street and 54th Avenue

Chicago Illinois

H-10

OF WASHING AND IRONING MACHINES

BITURINE COATINGS

Biturine Enamel *Biturine Solution No. 5*
Biturine Enamel Primer *Biturine 70-30*
Biturine Coupling Mixture

This group of protective coatings represents the fruits of more than 20 years of careful research and practical experience. Biturine Enamel and Primer are particularly adapted to the Hill, Hubbell & Company process of mechanically applying protective coating to the pipe at the mill.

Mechanically coated and wrapped pipe. The newest development in pipe line protection

Now you can buy line pipe mechanically coated and wrapped *at the mill.* No longer need the laying of new lines or the renewal of old ones be subject to the hazards and delays caused by the old method of applying the protective coating in the field. Your pipe is delivered to you ready to lay, fully protected by the Hill, Hubbell & Company process of coating the pipe and wrapping it at the mill.

The Coating and Wrapping of the Pipe is a Continuous Mechanical Process

It is generally accepted by authorities that *proper application* of pipe line coating is the most important feature in the success of any form of protection. Field applications under the most ideal conditions have never been productive of a 100% satisfactory job in all cases, owing to the unfavorable conditions under which the work had to be carried on—inclement weather—unskilled labor—varying temperatures—the difficulty of properly cleaning the pipe and applying the coating of the protective material so as to cover the surface thoroughly.

The Hill, Hubbell & Company process of mechanical application at the mill eliminates all these difficulties, and presents the following outstanding advantages:

1. The pipe is thoroughly cleaned of all rust and mill scale.
2. It is not only thoroughly dry but warm when the primer is applied.
3. The required thickness of the protective coating of Bitumen is applied *before* the felt is applied.
4. This thick coating is applied in two coats, insuring freedom from pin holes and bubbles.
5. The coating of felt is applied under tension and is exactly spaced and, therefore, perfect.
6. The whole process is mechanical, involving no human element, and no waste.
7. The entire operation goes on under roof and can proceed night and day regardless of weather.
8. Exact temperature control of the Bitumen is possible. This is important and cannot be had in field operations.

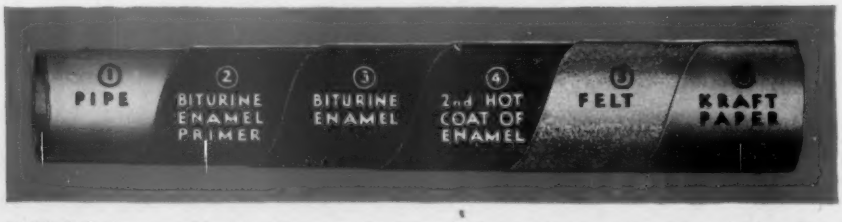
Plants for the mechanical coating and wrapping of pipe are located in the following cities for the production of the pipe manufacturers listed.

Central Tube Company, Ambridge, Pennsylvania; Spang-Chalfant & Company, Ambridge, Pennsylvania; Youngstown Sheet & Tube Company, Indiana Harbor, Indiana; National Tube Company, Lorain, Ohio; A. O. Smith Corporation, Milwaukee, Wisconsin; Youngstown Sheet & Tube Company, Youngstown, Ohio.

Others are contemplated and will be installed in the near future. Each of these plants is equipped to handle pipe up to 24 inch diameter and to conform to specifications covering a wide range of combinations of materials.

GENERAL PAINT CORPORATION
HILL, HUBBELL & COMPANY DIVISION
CHICAGO NEW YORK TULSA HOUSTON SAN FRANCISCO OAKLAND
LOS ANGELES PORTLAND SEATTLE SPOKANE

Write to our nearest office for literature descriptive of the process and for details regarding specifications.



Hill, Hubbell & Company Machine Coated and Wrapped Pipe is Your Best Insurance Against Corrosion

Analysis of Standard Articles

(Continued from page 70)

brands of tea in the market, 64.49 per cent. of the people were buying one brand, 13.15 per cent, were buying the next best selling brand, and 3.65 per cent. were buying the third best selling brand.

Thus a total of 81.33 per cent, of the people were buying three brands of tea and the remaining 74 brands were scattered among the balance of 18.67 per cent.

The same analysis applied to the other 29 articles shows the same condition, *i. e.*, the great bulk of people were getting along with three brands.—*Executives Service Bulletin.*

The Curves Tell the Story

By Jason Prudhomme

WHAT is it that builds sales; men, management or merchandise?

At first thought we would be inclined to say; Why all three, of course

It is an obvious fact that unless you have man-power, properly managed and merchandise to sell, sales will not be made. That seems reasonable, until we see concerns with all three who are not selling, in which case we resort to reflection. Reflection arouses doubts, however and calls for curves to analyze. The curves nevertheless prove the contention, that the essentials of selling are the things named above: men, management and merchandise.

However, a number of other things are essential, including a proper mental attitude toward merchandising. There must be a definite policy pertaining to sales and to salesmen's compensation, a plan of operation and a delegation of authority together with a generous amount of initiative and leadership.

Over a period of ten years gas company "X" sold thirty-five hundred and fifty-two gas ranges, or an average of three hundred and fifty-five ranges per year, which on a basis of residential meters averaged .08% per meter; and not a bad job, taken as an average and all things considered. However, it is not an outstanding one and this percentage might have been materially increased.

Taking this sale of ranges year by year and month by month for a period of ten years as something to work from we find many factors that clearly indicate that things other than man-power, management and merchandise go to make-up an uneven sales curve.

During the year 1915 sales, as will be noted by the curve, Chart No. 1, were going along in nice shape; pretty even as a whole, the only peak occurring in September. This curve indicates that the management was what might be termed "setting on top of the world", as far as range sales were concerned. It further indicates that the company had a sales organization and that it was doing a nice amount of business each month, month in and month out. In January, June, July, August and December it witnessed the old seasonal slump and during the month of September the usual flurry, a good stove business, which is always expected. This curve indicates satisfaction with sales and sales effort, everybody happy and not overworked.

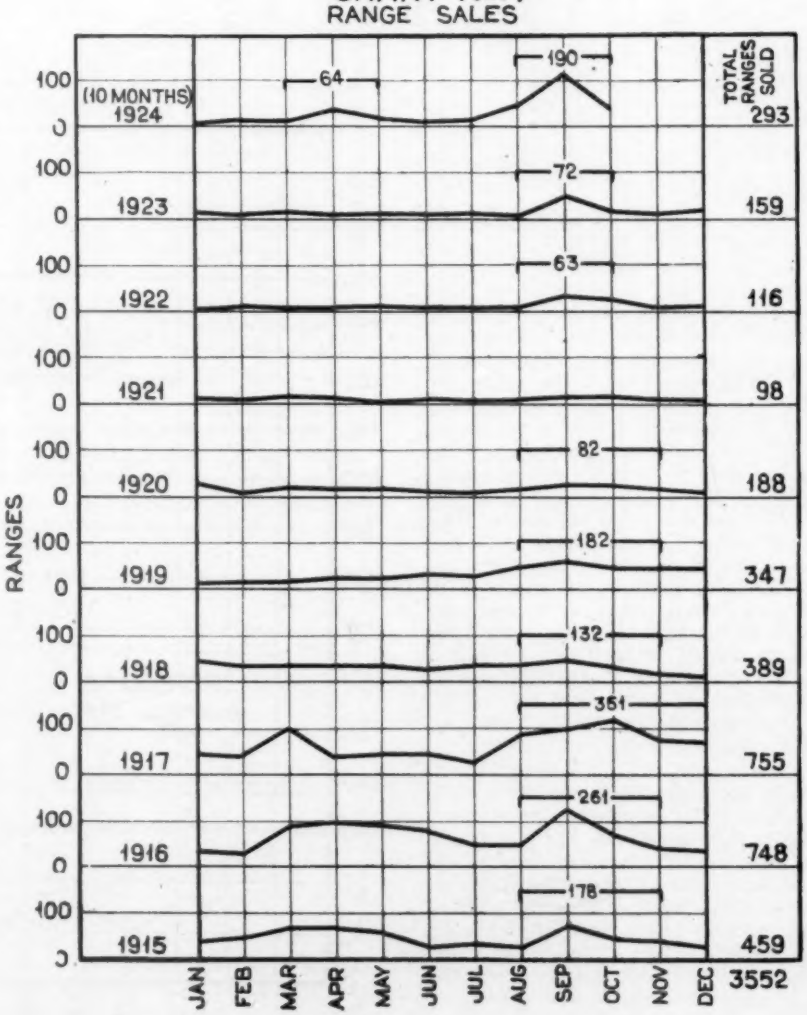
Now looking at the sales curve for the year 1916 we find that something happened to speed-up sales in May, and keep them up until July, that they reached a peak again in September and did not go below the fifty line until November. What happened here was that the management decided upon a consistent advertising and selling effort with the result that the sale of ranges jumped from four hundred and fifty-nine to seven hundred and forty-eight. Management had given initiative, authority and an opportunity to operate by plan and to advertise consistently.

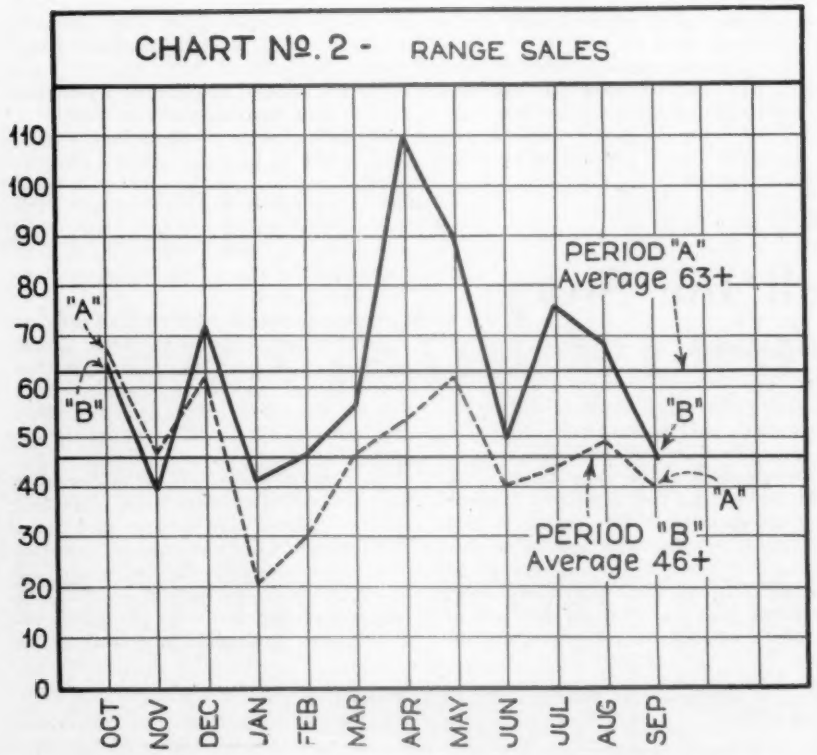
In 1917, January and February sales were about the average. With a memory of the previous year's volume in mind the management became restless, a bit anxious and staged a special sale during the month of March that sent sales to a new high for that month. Things pointed to a new record.

At this period the watch-dog of the cash register entered upon the scene. Sales costs were too high, "we're not paying our overhead on appliances, salesmen are making too much money for the effort they put forth;" the old story of the unsympathetic.

This attitude upset things, management cut commissions, new rules regarding sales procedures were written and customer's credits were tightened up, with the result that sales dwindled and a new low was jotted down for July and, presto, the management began to fear for its record. This again resulted in a revival of an

CHART NO. 1
RANGE SALES





equitable plan of compensation, the employment of new men (for the old force had become discouraged and left) and sales bounded on again, recording a new record for ranges; seven hundred and fifty-five for the year.

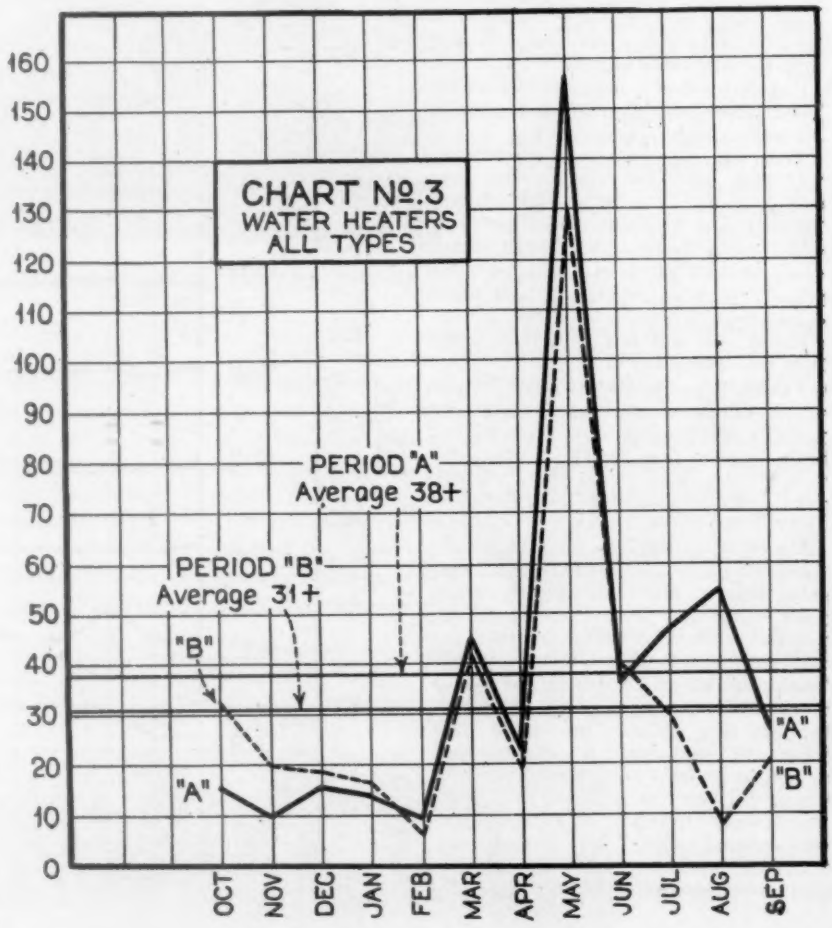
Then came the period of the war and its aftermath, 1918, 1919, and 1920, when selling appliances was the least of anyone's worries, and, as the curves for these years show, nothing was done.

Having done nothing during these three years the management developed apathy and did not seem to hit its stride for three more. Even during that period, from the beginning of 1919 to the middle of 1920, when everyone was buying nothing was done to perfect a selling organization or to display and advertise ranges or other gas consuming appliances. The mental attitude of the management was out of tune, there was no man-power, no merchandising authority or responsibility and very little merchandise in the company's store. As a consequence the business depression of 1921 recorded a new low for the sale of ranges, only ninety-eight being sold during the whole twelve months. 1922 and 1923, save for a proverbial increase in September, showed no improvement. Things were static.

With the coming of the New Year, 1924, the Home Office recommended that something be done about sales, and accordingly the management got busy, gathered an organization and on March first staged its first sale and began to advertise consistently, with the result that a fair showing was made, but not a satisfactory one. However, things drifted again until August when the "Powers that be" again prevailed and an aggressive campaign was started with the result that sales again began to boom.

A study of the curves will indicate that where systematic effort was put forth and a plan was provided sales were made and that where no leadership was present or an attitude of "what's the use" prevailed sales just did not happen. That it is absolutely essential for the gas company to have a consistent continuous sales activity there can be no doubt after a study of Chart No. 1.

To further illustrate the effect that planned sales and progressive selling have on the total volume of merchandise sold over a period of twelve months we exhibit Charts No. 2 and No. 3 showing the effect of special drives on the year 'round sale of gas ranges and water heaters. A study of these curves clearly indicates the effect of special planned drives on the average monthly sales of these two appliances. Chart No. 2 shows that when ranges were campaigned during the months of October, December and May for the twelve months period "A" and in October, December, April and July for the twelve months period "B", the sale of these appliances hit high and provided a fine monthly average for both twelve months periods. Chart No. 3 shows that water heater sales were staged during the months of May for the same periods with the same results accruing to bolster up the average monthly sale of this unit



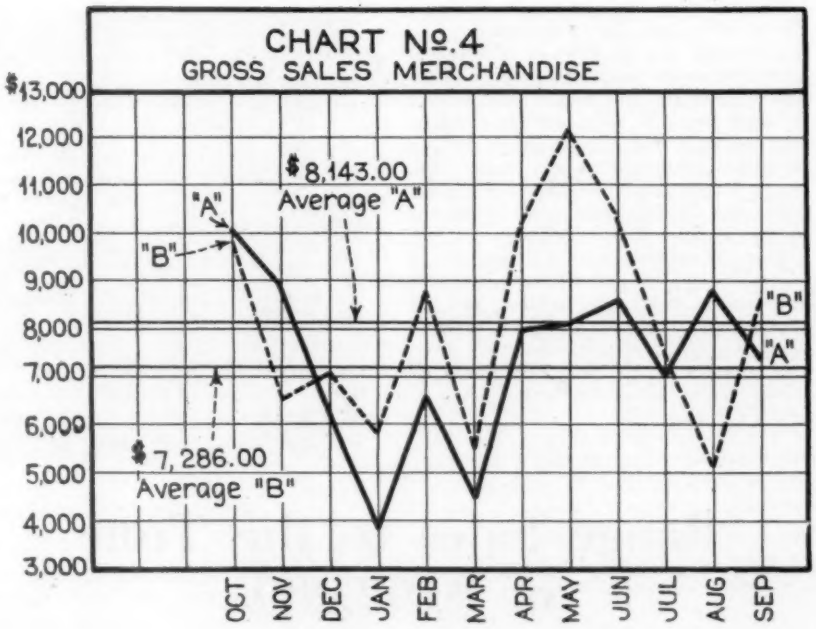
during both twelve months periods.

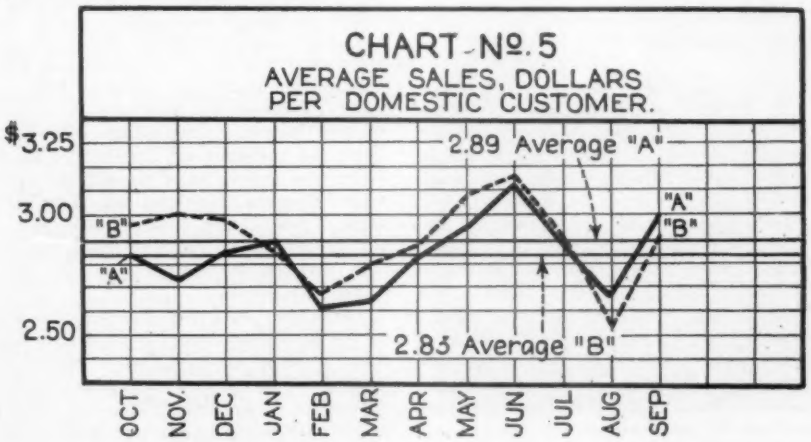
The further results of these sales is indicated by Chart No. 4 which shows the monthly gross sales of merchandise in dollars and cents for the two periods together with the average gross merchandise sales for all appliances for the two periods.

Another important fact brought out by these charts is that while the sales of both gas ranges and water heaters during the periods show a decrease, yet year "A" over "B" gas sales per domestic meter, as indicated by Chart No. 5, show an increase of six cents per meter while the total monthly average of gross merchandise sales shows an increase of $857.00 per month.

This increase in merchandise sales in the face of a decrease in the sale of what is often referred to as "the back-bone of our business," ranges and water heaters, is easily traced to the added sales of refrigerators, radiant fires, washers, clothes dryers, ironers and incinerators.

A summary of the above analyses proves that many things in regard to gas sales and gas merchandise sales depend upon the avenue through which they are





approached. However, this study is only to keep pace with competitive industries concerned with the manner of manage-selling fuel to the domestic and indusment, of one one thousandths part of the trial markets we will do well to devise whole and its effect on sales and to fur-a consistent, continuous plan of year ther strengthen our belief that if we are round selling. We will have to subdivide our efforts and specialize.

In other words, it is our opinion that to do the job in a bigger and better way or to even take care of the demands that will be made upon us for gas service we will have to have trained specialists with authority to go ahead, knowing that there is authority back of their authority that values initiative and ideas.

With such trained experts we may then call upon other idea men for campaigns and advertising that will enable us to have a consistent development of new appliances as well as afford us a material growth in the sale of such appliances for the use of gas in both the home and industry.

So it would seem that men, management and merchandise will produce sales if some man who can judiciously exercise authority is provided with merchandise and man-power properly trained and compensated to carry out a continuous sell-campaign in both the home and industrial field.

Wilmington Self Action Water Heater Sales Increase Sixty Percent

HOW large a percentage of self-action gas water heaters to the total potential market can an organization hope to sell each year? Many sales managers would like to have a gauge to provide them with an answer to that question—a gauge by which they might judge the actual success of their selling campaigns.

The Wilmington Gas Company, Wilmington, Del., managed by Mr. R. B. Richardson, is selling Welsbach Hotzone heaters at the rate of nearly 2½% of its potential market during 1929. Putting it another way, this organization, with 28,000 meters on its lines, bids fair to sell well over 700 water heaters this year. It would be interesting to know how this compares in percentage of potential market with other organizations who believe they are doing a good merchandising business.

During 1928 a splendid sales record was set up. This year's familiarity with the heater, plus increased sales pressure, has brought an increase of 65% for the first seven months as compared with last year's sales.

Mr. B. H. Atwood, manager of merchandising department at Wilmington, has succeeded in gathering around him a group of men who are genuinely interested in their work and are plugging for all they are worth. They have the stimulation of a fair commission arrangement and excellent terms with which to help them keep their enthusiasm at a high pitch.

The salesman is allowed 7½ to 10% commission on sales plus special premiums on automatic water heaters amounting to as much as 3 or 4% additional. The payment of commissions is made only after the sale is definitely closed.

To all gas company employees, not in the sales department, who turn in the name of a prospect that results in the sale of a self-action heater, substantial premium is paid. This has stimulated the interest of a large number of employees with resulting leads for the sales men to follow up.

The Wilmington Gas Company makes a liberal allowance for old heaters. In Wilmington, nearly 85% of the homes have coal stoves for heating water. This makes an initial sales hurdle very difficult to overcome. A very generous allowance is made for a coal heater with a somewhat smaller allowance for a tank water heater or a furnace coil. The terms are 30 days trial with 18 months to pay, or 5% off for cash.

This gas company makes liberal use of advertising material of all types including newspapers, direct mail folders, gas bill stickers, blotters and attractive window displays. The principle sales work however, centers in Mr. Atwood's group of salesmen who have been well coached in selling the prospect.

Using an average of 3700 cu. ft. per heater per month, the Wilmington Gas Company, during the first seven months of 1929, has succeeded in adding a monthly output of more than 1,400,000 cu. ft. of gas. It has, in addition, paved the way for other gas appliances since the salesmen, in making their contacts with prospects, are instructed to make a list of all appliances in use, thereby creating a list of prospective purchasers of other gas equipment.

No small part of Wilmington's successful water heater campaign is due to the invaluable cooperation of the Service Department under Mr. R. R. Johnson, the day and night are available for whatever may turn up.

Range Sales to the Tune of $192,000.

Southern Cities P. S. Sells 'em in Sultry Summer

By Special Correspondent

WHAT may be said to be the sales event of the year in the south was the "Roper Round-up Sale" staged by the Southern Cities Public Service Corporation during the month of August. The sale was conducted simultaneously in the following twenty-six southern cities: Atlanta, Augusta, Brunswick, Griffin, Columbus, Macon, Rome, Valdosta and Waycross, Georgia, Charleston, South Carolina, Concord and Gastonia, North Carolina, Anniston, Decatur, Huntsville, Montgomery, Selma, Tuscoloosa and Mobile, Alabama, Hattiesburg, and Meridian, Mississippi, Port Arthur, Texas, West Palm Beach and Key West, Florida.

Early in May A. C. Crandall, General Commercial Manager of the company together with his assistant, G. J. Kollock, decided to stage a gas range sale that would round-up all the antiquated gas ranges in the above cities and arouse a general interest in modern equipment and a desire for the newest in gas ranges. Together they set about laying out a plan, an advertising budget and building quotas of ranges to be sold, as well as devising a method of procedure. After a lot of study it was decided that, in that the sale was to be a replacement sale, all plans would be laid to feature and push the better class of ranges and accordingly the Roper three-quarter enamel oven control range was chosen as the leader. This range was priced at $99.50 cash or $104.00 where the customer wished to take advantage of the little-by-little plan of payment. The terms of payment were $1.00 down, with the balance payable in twelve equal monthly payments with the gas bill.

To further induce the owners of old ranges and ranges without oven heat control to take advantage of the special sale an allowance of $14.15 was made for old stoves during the sale.

Other ranges sold during the sale also carried an allowance for old stoves. Ranges selling from $50.00 to $75.00 carried an allowance of $8.00; ranges selling from $75.00 to $100.00 exclusive of the feature range carried an allowance of $10.00, while all ranges priced over $100.00 carried an allowance of $12.00. The idea back of this as stated above was to encourage the purchase of the feature and other better class ranges.

The plan of the campaign was worked out in detail by the Atlanta headquarters well in advance of its opening and three weeks prior to the opening Mr. Crandall furnished each of the district managers with a complete set-up of the activity, including copies of advertising to be used, a suggested budget and quota together with suggestions for stunts to be carried on to arouse employee interest and for publicity purposes.

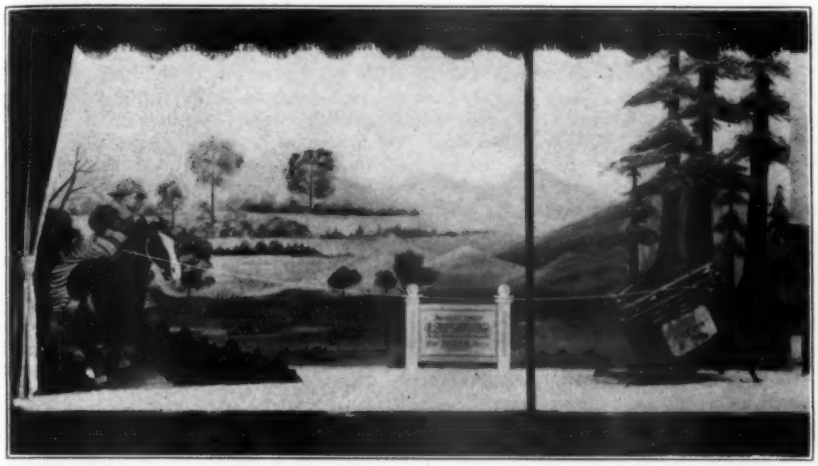
All advertising was designed to permit the insertion of anything in the way of "local color" that the managers deemed advisable. The material sent out by the headquarters office included a supply of bandana handkerchiefs for distribution to employees and the kiddies who visited the stores during the "Round-up", all handkerchiefs bearing the imprint, "Roundup". Aside from newspaper advertising and store and truck display advertising each district was furnished a carefully written sales letter for mailing to all prospects at some time during the "Round-up".

Organization

One week before the sale opened R. C. Hoffman, Jr., Vice President of the company called a general staff meeting at which all plans were gone over in detail and organizations for the company's three districts were perfected. At this meeting W. W. Winter, General Manager of the Western Division was made boss of the Western Cow Camp with E. J. Stern as assistant or Top-hand; M. L. Kane was made boss of the Atlanta Camp with Howard Bowman as Top-hand, while J. W. Gates, General Manager of the Eastern Division, was made boss of that division with Fred Eve as Top-hand.

These men were told that the plan was to do an outstanding job of selling and that initiative and ingenuity would be mighty helpful in informing prospective customers of the sale. This tip without exception proved productive and wherever native wit and circus methods were employed the campaign went over in true rodeo style. Some of the interesting tie-

"Mobile Straight Eight"



Round-up Window Macon Gas Company

ins used were as follows: In the Western Division Messrs. Winter and Stern purchased a "five-gallon" hat which was worn by the district manager of the property selling the fewest ranges each week with an added penalty, that as an additional evidence of his inability to keep up with the "punchers" he would have to have a photograph taken while wearing the hat and send a copy of it to the managers of all other divisions.

In Mobile, where a really remarkable record was made, sales ran 315 ranges for a total of 7500 meters; many publicity stunts were used one of which proved a hig hit, it being the "hay-burner" which paraded the city each day during the campaign. H. W. Gee, Manager of the Montgomery property employed a giant and mounted him on a cow-pony to advertise the Round-up. Anniston under the direction of Graham Kirkpatric piled a truck load of "rounded-up" stoves in the display window and with an animated poster cut-out presented a realistic round-up to all passers. G. H. Hilliard of Tuscaloosa also had an attractive window display, while Atlanta and Charleston also went in for special stunts and circus methods for attracting attention to the big campaign.

Some of the outstanding sales were: Montgomery, 184 ranges with 4,014 meters, and an average selling price per range, after deductions for old stove allowance, of $76.77; Tuscaloosa, 54 ranges with 1700 meters and an average sale price of $81.92; Atlanta, 1058 ranges; Charleston, 108 ranges; Brunswick, with 1100 meters, 44 ranges at an average selling price of $100.66; Macon, 174 ranges with 7000 meters, and this following immediately upon a clearing sale.

The total results of the campaign netted a sale of 2554 ranges from 116,400 meters at an average sale price of $76.56 after deductions for old ranges had been made. The total volume was $192,000.94 for the campaign. This is further evidence that heat, humidity or habit know no seasons where a company plans its work and works its plans and further proves that folks do not buy gas ranges during the sultry summer months—but rather that they may be sold.

"Whoopee" of Mobile Gas Company

A Hummer

From Cabinet to Console—It's here for the kitchen; the gas range de LUXE; a product of all American Stove Company Divisions—a range that will give the salesman a plenty to talk about and a range that will bring many new faces and sales to the gas company and dealer's stores. The range which may be classed with the much talked of "Highboys" is finished in two colorful combinations, looks like a million and will sell, delivered and connected for less than two hundred. It was introduced through National Advertising the first of which appeared on September 19th. Here we feel is a range that will help to retain that domestic cooking load and build it up; it's the range we have longed for, a range that almost proves that our suggested design, which appeared in *The American Gas Journal* for January, 1928, was not such a punk one.

Good Bait

What does the home manager look for when she reads advertisements?

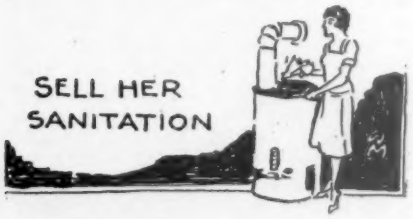
We say she looks for news and newness, that she is not so much interested in "labor saving" as some folks think. She is more interested in keeping up with the Jonses and therefore if we strive to tell her of the newness of our merchandise we are more apt to have our story register.

It seems we have played with the word "labor" a bit too freely in our advertising. Why not try *happiness* and *beauty*, newness, the modern, the carefree, the convenient, the rapidity and flexibility of gas the carefree fuel for home uses. Harmony of color, health giving rays and freedom for festivities outside of the home all have pulling power. Why not use such tempters to write our ads around?

Speaking of Incinerators

Fall is an ideal time to sell incinerators. Women detest that trip to the garbage can in the cold, rain or snow. It is dangerous. Also they are aware of the necessity of fussing with food

scraps and leavings in frozen garbage cans on cold days. They know that the collector fails to call about half the time during the fall and winter months, that the disposal of garbage and refuse during this period is always a problem.



Advertising playing up these facts and telling of the conveniences of the gas incinerator will sell them this fall. Sell her sanitation, no running out of doors in wet cold or rainy days, offer her this convenience on the little-by-little plan of payment and you will sell her. That's what you'll have to do to get the increase per meter from incinerators—folks will not take them away from you until after you have sold a considerable number.

Make Them Look

The president of an advertising agency was having some difficulty in getting dealers in a certain line to appreciate the value of "exposing their merchandise to sales". He had tried in several ways to arouse their interest in this phase of merchandising and, while each plan tried secured some results, they were spotty. Finally he decided to bombard the fifteen thousand dealers with a series of personal letters. These letters were very interesting in that thy put over the idea in a quick, brisk manner. One of them dealing with display is quoted below, for any idea it may hold for the elect.

"Astounding as it may seem, we encountered a small merchant in the city last week who boasted that he had not allowed any one to decorate his windows during the last ten years. Is it any wonder he was small? He offered nothing to the business that buzzed around him, and he got practically nothing. He had the germ of Failitis. Something snapped, he saw the light. A real salesman got to him, decorated his window, and in the ten days following he sold, of the article displayed, more than he had sold in any previous twelve months.

The answer is simple: Show what you have to Sell; Push the thing with Profit; Hustle or you will be in a H—— of a fix. Everybody looks into windows that are alive. Any merchant who, theoretically, pulls his blinds down to passing crowds is actually out of business. Make the window the show place, make the counter on the inside attractive, put a good salesman in charge, and as a team, the combination can't be beat."

That is worth reading again by the man who is complaining of the lack of store sales. Merchandise attractively exposed will sell. Try it, and change the display frequently.

Needed—One Degree

"He only Wanted One Degree" added to the temperature of the room—and he got it, because he used gas as the carefree fuel. That, in effect, is the theme of a recent advertisement used in a number of New York state newspapers. An advertisement in tune with the times,

IT WAS early fall. The first faint chill of the season was in the air—just the difference between discomfort and perfect content.

It all hinged on one degree of additional warmth...but what a nuisance to build a fire!

In cases like this, automatic Gas Heat once again proves its superiority. Only a tiny safety pilot when the weather is warm...instant, glowing warmth, without care or attention, when and where you need it.

Hundreds of reasons and thousands of users recommend Gas Heating Service. Why not let us estimate your requirements today, under our special low rates for this purpose?

The attached coupon will receive our prompt attention.

NORTHERN UNION GAS COMPANY
F. B. BARNITZ, *President* TEL. RAYMOND 5000
310 EAST KINGSBRIDGE ROAD *Near* East Fordham Road

CENTRAL UNION GAS COMPANY
F. B. BARNITZ, *President* TEL. MOTT HAVEN 1100
525 COURTLANDT AVENUE *Corner* East 140th Street

BRONX GAS & ELECTRIC COMPANY
EUGENE H. ROSSNQUEST, *President*
43 WESTCHESTER SQUARE TEL. WESTCHESTER 9400

GENTLEMEN: Since it does not obligate me in any way, you may send me complete information about heating my home with gas.

Name _____

Address _____

built for the man who does not quibble over a quick lunch but who believes in regular service for his home—and comforts. Look at the layout of this ad, count the words in it. It's built to suit the *tempo of the times* and holds an idea for the man who wishes to tabloid his story.

The Ever-Present Problem

Whenever we can secure public acceptance of our knowledge that "Home cooked Foods Are Better", more palatable, nourishing and healthful and thus wean the women in the home away from chauffeuring a can-opener we will have done a real selling job.

Home management is the most absorbing business in the world and the heart of the home is the kitchen gas range. Let's give the kitchen a lot of thought these coming months. As cool weather and cold weather approaches and appetites sharpen and folks have more time indoors. There are many reasons why foods should be cooked at home than we have ever talked about. Have the home service department dig them-up and get them to the home manager. Let's work-out some brand new advertising that will get the idea over and banish the archaic variety used in the days of the old "box-type" range, before the days of bright porcelain enamel, oven insulation and regulation, to say nothing of the automatic lighter and other innovations and conveniences embodied in the modern gas range.

A Sad Story

We once knew a gas appliance salesman, a porch-climber, if you must, who did not know enough to know that business was bad.

The dad-blamed cuss was so chuck-full of inspiration and aspiration that he spent about six hours every week day in exposing himself to sales. The poor dud, made money too, bought himself a home and a car. Manufacturer's repre-

sentatives referred to him as a good-man and he attracted the attention of some forward looking business men. Yet, he

paid no attention to all the h—— and hurrah; he was too busy with his business of selling happiness to the home manager. Strict adherence to his job and consistent calls at the homes of his customers were earning him Real Money and a Regular Outlook on life for himself and family, when—we hate to spoil this story,—a man who dealt in figures conceived the idea that the commission being paid him was too high and that his territory was too large or some other such flimsy excuse, and now,—he is selling, let us say, common stocks, and going strong and the man, or we should say men, for there has been many of them, who took over the job on the cut-commission are doing only a mediocre job of selling,—when business is good. The moral of this tale is that you can't keep a good man down especially if he don't know enough to know that business is bad.

Up and At 'Em

"A venerable Industry Awakens" is a head line used in the first issue of "The Business Week" in telling the world what is happening to the gas industry and warning that "The electircal industry will need all its ingenuity" in "the race for supremacy" in furnishing fuel for family and factory uses. The article goes on to say; "The gas interests are just now waking up to their powers. It is all very disturbing to the electrical men. They have been fairly smug. The increasing inroads of gas have given them a sudden jolt." Rah! for our side. Let's hope they have been observing the manner in which some of the gas men have tackled merchandising.

Gas House Heating

The large majority of homes are equipped with a coal fired boiler or hot air furnace in good condition. Many want to use gas for their fuel, but hesitate to discard their present heating apparatus if it is in good condition.

The Peoples Gas Light & Coke Company, Chicago, Ill., are going after this house heating load with a rental proposition. They are installing the Roberts Controlled Gas Heating Unit in coal fired steam, hot water or hot air furnaces on a rental of $5.00 per month. They give the customer the privilege of buying the burner at any time.

The Iroquois Gas Corporation, Buffalo, New York are going after this load in a different way. They have taken over the exclusive agency for the Roberts burner in the territory they serve. They offer to install a burner for a free trial until January 1, 1930. If the customer is not satisfied by that time they remove the furner. If the customer purchases the burner, they have 18 months to pay for same if desired.

Every burner installed under these two conversion plans will ultimately mean a new gas fired boiler or hot air furnace.

Don't carry ashes another winter!
Let Our Gas Holder Be Your Fuel Tank
Now you can rent a
Gas burner
for your furnace
$5 a month rental
YOU'VE been wanting better heat . . . truly automatic heat for your home. Now you can TRY gas heat—without any heavy initial expense or radical change in your present heating system! Test out this simple automatic Gas Burner in your home on a purely rental basis for $5 a month, with option to buy!
So certain are we of your satisfaction with the cleanliness, comfort and convenience of automatic Gas heat that we make only a small charge for installing this Gas Burner, complete with automatic controls, in your present coal or oil burning furnace. Fits right into your present heating system—warm air, steam or hot water.
If the Gas Burner is not entirely satisfactory, we will remove it, and restore your furnace to its original condition. You have no heavy initial investment to sacrifice . . . no expensive storage tanks or equipment to tear out of your premises. Make this simple change-over now and enjoy the comfort of Gas Heat next winter. By far the most advantageous heating offer ever made to Chicago home owners. Act NOW!
Special Low Rate for Gas Heating in Chicago
Phone Wabash 6000, or
Use This Coupon
The Peoples Gas Light and Coke Company,
122 S. Michigan Ave., Chicago, Ill.
THE PEOPLES GAS LIGHT AND COKE COMPANY
Downtown Office—122 South Michigan Avenue. Open 8:30 A. M. to 5:30 P. M. daily—or
Neighborhood Offices listed below; open daily 8:30 A.M. till 5:30 P.M. Thursdays and Saturdays till 9 P.M.
YOU CAN DO IT BETTER WITH GAS

The Iroquois Gas Corporation, having taken over the sale and installation of Roberts Controlled Gas Heating Unit for Buffalo and vicinity, makes this unusual offer:
Now you can Buy a
Roberts Gas burner
for Your furnace
Free Trial
UNTIL JANUARY 1st 1930
Then--18 Months to Pay
Here's what you've been waiting for. A chance to try out the popular Roberts Gas Burner in your own furnace. See for yourself what it can do in your home—at our expense.
We'll gladly install a Roberts Controlled Gas Heating Unit in your furnace, and let you use it until the first of January. Then, if you decide to keep it—and we know you will—18 months will be allowed you to pay. (If you don't like it, out it comes without cost or obligation on your part.)
FREE SERVICE BY IROQUOIS
The Roberts Controlled Gas Heating Unit can be used in any type furnace — steam, hot water, vapor or warm air. Scientific in principle and ruggedly constructed, it will give years of economical service. Every Roberts Burner is guaranteed, and serviced by the Iroquois Gas Corporation.
CLEAN SAFE TIME-SAVING
The Roberts Burner is the cleanest and safest on the market — a REAL investment in health. An improved thermostatic control insures correct, uniform heat. All the inconveniences of other fuels are done away with, and you don't have to pay for your fuel until after you use it. The Roberts Unit is reasonably priced and easy to install.
Let us explain more fully the many advantages of the Roberts Controlled Gas Heating Unit. Mail the coupon today!
CLIP THIS COUPON NOW
IROQUOIS GAS CORPORATION,
45 CHURCH ST., BUFFALO, N. Y.
Gentlemen:
IROQUOIS GAS CORPORATION
BUFFALO, N. Y.
YOU CAN DO IT BETTER WITH GAS

Typical Arrangement of a Home Service Hall

The New Home Service Department

Some Suggestions for Its Establishment and Operation

Luella M. Fisher and Grace Rebman Preston

Eriez Stove and Manufacturing Co.

HOME Service has arrived, no doubt about that, but while it is thriving and growing to greater proportions in some places, in others it is just a new baby, ready for its first instructions. Too often, there is no one at hand to give the A B C's of Home Service Work. The following suggestions and outlines are for those who are planning or have planned a Home Service Department and in doubt as to what the next step is, wonder where to turn for guidance. While they deal mostly in generalizations in order to best cover all cases, yet enough detail is given to aid those who are in doubt as to proper methods of getting specified results.

The executive who is considering the founding of a Home Service Department, wonders what it may be reasonably expected to accomplish. We answer:

AIMS OF HOME SERVICE DEPARTMENT

1. *Follow-up on all sales of household appliances*
2. *Complaint calls*
3. *Instruction calls*
4. *Survey work*
5. *Cooking lecture demonstrations*
6. *Floor demonstrations*
7. *Club lectures and talks*
8. *Luncheons for Clubs*
9. *Suppers for employees*
10. *Tie-in with educational institutions*

RESULTS EXPECTED

1. *Good will*
   - a. *A better, friendlier feeling toward gas as a fuel, and toward gas companies merchandising that fuel.*
   - b. *Public educated to value of modern, efficient equipment*
   - c. *Appreciation through use of services offered by the utility*
2. *Increased gas sale*
3. *Increased sale of appliances*
4. *Employee education*
5. *Future users of gas and appliances*
   - a. *Accomplished through work with educational institutions*

Many details enter into the picture we must make in establishing a Home Service Department. What is the size of our utility? Do we serve 100,000 meters in one county, or just 1000 meters? Do we serve many times that number in a dozen or more counties? In each of these cases the problem must be answered in slightly different versions. Other factors will enter into the picture. What types of people are our consumers, what proportion of them are foreign born, what proportion colored? The economic conditions of these groups must also be considered.

The establishment of the Home Service Department is of course, decided upon by company officials who provide a budget for expenditures, then turn the entire matter over to one or more of the officials and the Home Service Director to Work out. Or, if the Home Service Director has been chosen before the department is established, she is called upon to present to company heads, a working plan and budget. When it has been approved or disapproved and replanned, then the actual making of the Home Service Department begins.

In some utilities, the Home Service Director is responsible to the Commercial Manager who suggests the direction her efforts are to take. In others, the Home Service Department may come under the direction of the Vice President in Charge of Sales. In some cases the Home Service Director is responsible to the Public Relations Director, or occasionally to both Sales and Public Relations. But no matter under what official she may work, she must always hold in mind the thought that she and her department must sell,—yes SELL, either directly or indirectly, the thought that gas is a good fuel, it is to be used, her company is eager and willing to give the public the best service possible, and the appliances sold by her company are good appliances, giving good service. In some cases, she may actually take orders for appliances. The Home Service Director's plans must always work in accord with those promulgated by company heads.

Now to choose a Home Service Director. We consider:

- *A. Personality*
  1. *Must be likeable*
  2. *Attractive to both women and men*
  3. *Pleasantly forceful*
- *B. Education*
  1. *College training preferred*
  2. *Specialization in Home Economics and such Sciences as Physics and Chemistry*
  3. *Knowledge of Commercial Subjects*
- *C. Appearance*
  1. *Attractive*
  2. *Neat*
  3. *Capable looking*
- *D. Experience*
  1. *In Home Service Work*
  2. *In business world*
  3. *In teaching*
- *E. Ability*
  1. *Must be good executive*
  2. *Good public speaker*
  3. *Good contact woman*
- *F. Age*
  1. *Twenty-five years of age or older*
- *G. Salary*
  1. *$110 to $150 per month to start*
  2. *Promises of increase with advancement of department and use of utility*

PERSONNEL OF HOME SERVICE DEPARTMENT

- *A. Director*

(Continued on page 85)

American Stove Company Announces the New Vogue in Gas Ranges

Magic Chef

FRANK ALVAH PARSONS

New York School of Fine and Applied Art,
Broadway at Eightieth Street,
New York.
9 Place des Vosges, Paris.
Office of the President,

Arthur Stockstrom, Esq.,
Secretary, American Stove Co.,
St. Louis, Mo.

Dear Mr. Stockstrom:

In many cases the kitchen is the most important room in the house; the stove the most important furnishing of the kitchen.

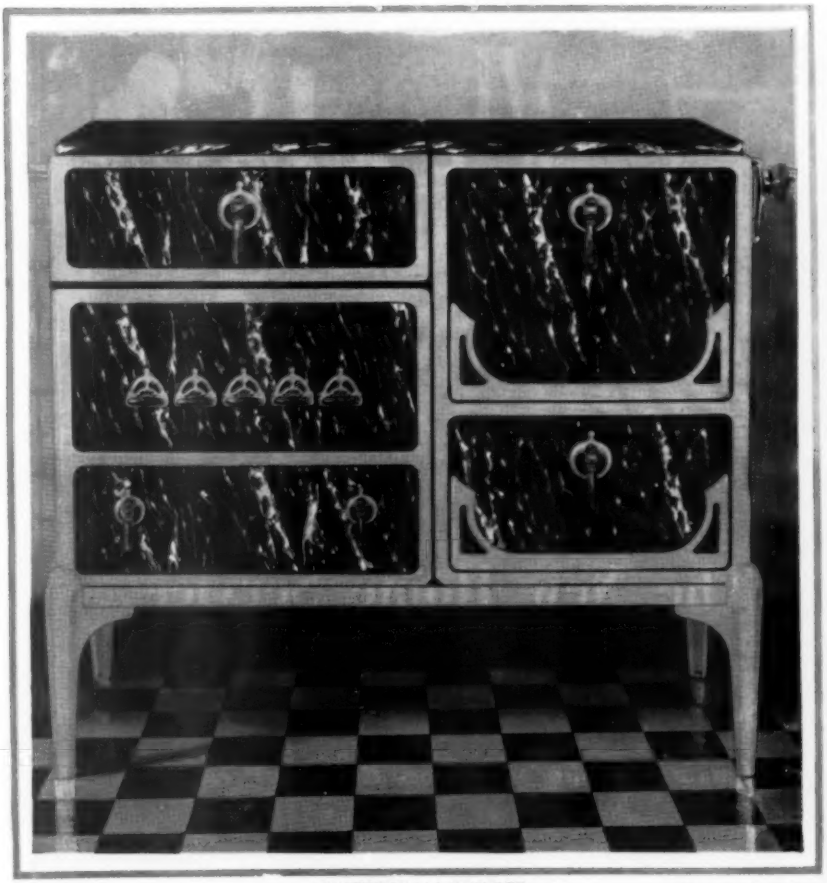
It was therefore with more than ordinary interest and enthusiasm that the New York School of Fine and Applied Art consented to co-operate with your designers in the creation of the "Magic Chef."

The "Magic Chef" embraces a distinct forward step in the national movement to combine utility with beauty in home furnishings. I heartily endorse its introduction into a field of endeavor in which the commonplace has reigned so long.

Very truly yours,

Frank Alvah Parsons

UNLESS the Gas Range has a RED WHEEL it is NOT a LORAIN



PATRICIAN MODEL *Patents Pending*

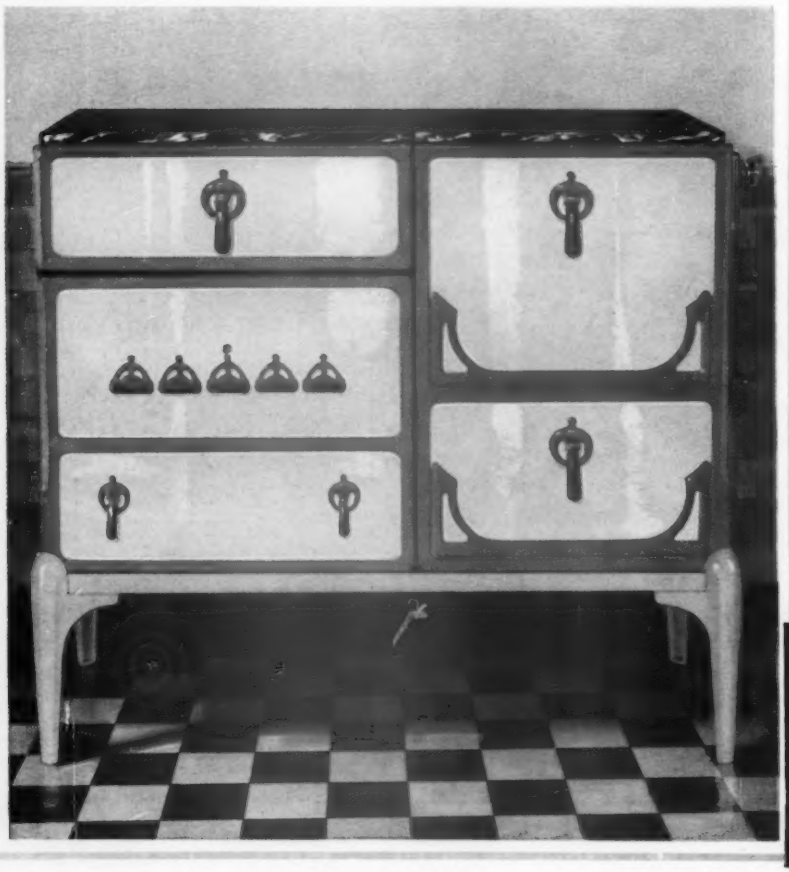
UPSETTING all traditions, ignoring all precedent, American Stove Company has created a new, exquisite and totally different type of gas range—"Magic Chef"—to satisfy the demand for a stove to conform with the art trends of the times.

Authorities in interior decoration have pronounced "Magic Chef" the most notable style-creation in the house furnishings field in a decade. For this immediate acceptance by experts a large measure of credit is due Frank Alvah Parsons, B. S., President of the New York School of Fine and Applied Art, whose expert advice contributed materially to the artistic perfection of "Magic Chef."

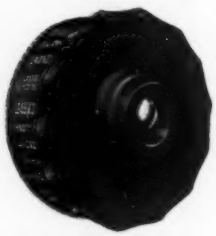
But, "Magic Chef" has more than pleasing proportions, symmetrical lines, beautiful finish and radiant coloring. "Magic Chef" possesses, in addition to the famous Red Wheel, many exclusive service features that make it an unusually durable, efficient, labor-saving cooking appliance.

"Magic Chef" is the fulfillment of a perpetual promise made more than a decade ago, when American Stove Company first announced the creation of the Lorain Oven Heat Regulator, which automatically assigned to this institution the duty of continuing to be the first to create improvements of outstanding merit in gas range construction and design.

The new *Voque in Gas Ranges*



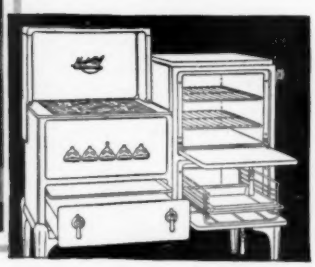
Magic Chef



UNLESS the Gas Range has a RED WHEEL it is NOT a LORAIN.

$195.00

($210.00 West of the Rockies
Send for free booklet



JONQUIL MODEL

Patents Pending

1. "Jonquil" Model shown above is made in Old Ivory with Peacock Green Trim and top in Italian Grand Antique Marble finish. "Patrician" Model shown on preceding page has top and front panels in Italian Grand Antique Marble finish with Old Ivory Trim. Handles of both models are of Onyx Green Bakelite with solid brass fittings. Stoves are all-enamel.

2. The "Magic Chef" Oven is equipped with the famous Lorain (Red Wheel) Oven Heat Regulator.

3. Cooking-top cover spring-balanced, easy to operate. Unsightly utensils quickly covered.

4. "Magic Chef" Oven, also oven and broiler doors, are heavily insulated.

5. Pipes, gas valves and all bolts entirely concealed. All valves convertible by the turn of a screw into "safety" valves.

6. Unique Broiling-feature includes an extension carriage that brings broiling pan into full view for the easy turning of meat. Reversible broiling pan requires no rack.

7. Top-burners of new, vertical-injection type have removable, non-corrosive heads. Each burner can be used as a simmering or a giant burner.

8. Roomy service-drawer mounted on rollers operates easily even when heavily loaded.

DIMENSIONS (Both Models)

For Both Models	Extreme Dimensions	Baking Oven	Broiler	Cooking Top	Service Drawer
Height	43½"	14"	9"	from Floor 34"	6"
Width	49¾"	17"	17"	25½"	21½"
Depth	27"	20½"	20½"	22¾"	22"

Height of Cooking-top Cover (when open) above Cooking-top	15"
Clearance between Cooking-top and Cover (when closed)	7½"
Height of Stove Base from Floor	12"
Size of Flue	4"
Shipping Weight	330 lbs.

AMERICAN STOVE COMPANY

801 Chouteau Avenue — St. Louis, Mo.

Largest Makers of Gas Ranges in the World

Dangler Stove Company Division - - Cleveland, Ohio
George M. Clark & Company Division - Chicago, Ill.
Quick Meal Stove Company Division - St. Louis, Mo.
Direct Action Stove Company Division - Lorain, Ohio
New Process Stove Company Division - Cleveland, Ohio
Reliable Stove Company Division - - Cleveland, Ohio

New Home Service Department

(Continued from page 82)

B. Home Service Worker for each district
C. Stenographer, if unable to get such work done through stenographic department

Before beginning work in the Home Service Department, the Director and all her assistants should follow a course of training.

TENTATIVE OUTLINE FOR TRAINING HOME SERVICE WORKERS

General survey of personnel necessary for operating a utility.

A. Wherever feasible, the newcomer should spend a few days in each of the following departments:
1. Applications
a. Meter Department in relation to application or service
2. Information
3. Engineering
a. Pressure
b. Distribution
4. Telephone
5. Make house calls with service men

B. A study of Gas as a Fuel.
1. Story of Production
a. Trip through plant (if manufactured gas)
b. Talks on Production (if natural gas)
2. Trip through shops
a. Meter Connections
b. Proper size piping for dwellings

C. Study of equipment used in the moaern home.
1. Range
2. Refrigerator
3. Water Heater
4. Room Heater
5. House Heating systems
6. Laundry Appliances
7. Incinerator
a. From technical standpoint
1. Construction
2. Automatic Control
3. Efficiency in Operation
4. Consumption
b. From customer view-point.
1. Health
2. Convenience
3. Economy
4. Appearance

After being informed on the above, the Home Service worker is then ready to co-ordinate the material given her and put it into form for presentation to the public.

In planning a Home Service Department, we have again, many things to consider, greatest of which is the budget. Then we must work within that limitation of expenditures to secure the results we want.

Where the number of consumers is large enough to make it advisable, a Home Service set-up of Auditorium, kitchen and office and perhaps a lounge, should be planned. Where the utility is housed in a building admitting of it, rooms may be remodeled to fit the requirements of the department, or rooms as planned should be used. Some will be fortunate enough to have the planning of a Home Service Department in a building about to be constructed, then every effort should be made to provide fully for the growth that will come.

AUDITORIUM WITH KITCHEN ON STAGE

A. Should be large enough to provide seats for at least 100
B. Lecture Platform
1. Ten feet by twelve smallest allowable size
2. Fifteen feet by thirty feet preferable
3. Equipment
a. Two porcelain top tables or desks
b. Two kitchen stools
c. Kitchen Cabinet
d. Built-in cupboards
1. Quantity enough of following to serve employees
aa. Utensils of most efficient kind
bb. China
cc. Glassware
dd. Silverware
ee. Linen
e. Large sink with drainboards
f. Gas range with test meter
g. Gas Refrigerator
h. Gas Lecture Set-up of—
1. Section of street main, service, curbbox, meter, 1¼ inch manifold with connections to
aa. Radiant type heater
bb. Log or asbestos grate
cc. Water Heater connected to sink
dd. House heating burner
ee. Incinerator
2. Large meter chart or blackboard
3. Gas charts on production, transmission, distribution, utilization

C. On display in auditorium
1. House heating appliances
2. Laundry appliances
3. Garage Heaters
4. Fireplace heaters

D. Storeroom
1. For storing of large utensils
2. For storing surplus supplies
3. For storing extra equipment, tables, etc.

E. Office
1. May be corner of large room
2. May be small separate room
3. Should be accessible at all times
4. Should contain
a. Large desk
b. Typewriter desk or table
c. Chairs
d. Typewriter
e. Mimeograph machine if none available elsewhere
f. Bookcase containing
1. Reference books on gas and gas appliances
2. Cookbooks
3. Texts on cookery
g. Files
1. Correspondence
2. Recipes from other Home Service Departments
3. File for own recipes.
4. Card File
A. Mailing list
B. Complaint and sales follow-up lists.
C. New Consumer list

A lounge, no matter how small, offers a meeting place for women and wherever budgets permit, should be planned.

Lounge furnishings to include

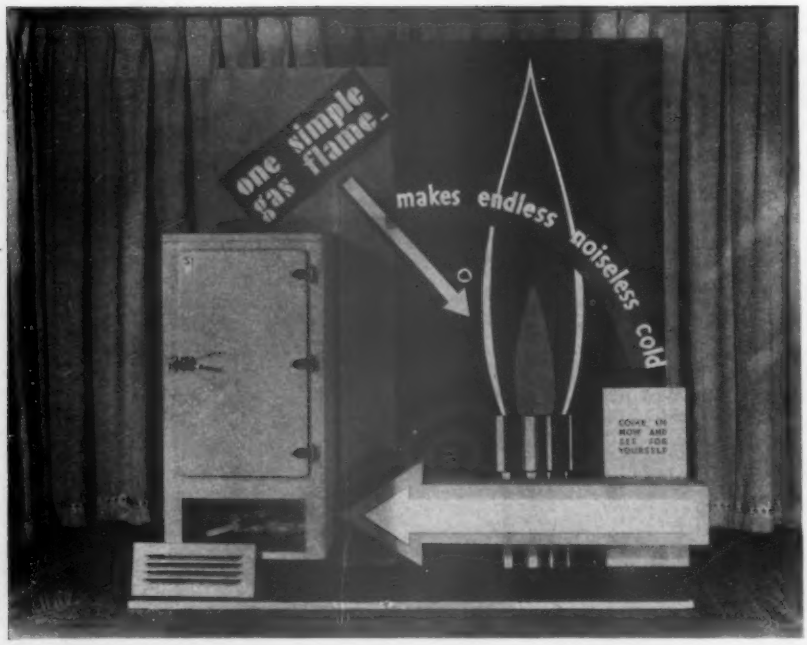
A. Upholstered settee
B. Comfortable chairs
C. Table with Women's Magazines
D. Rugs
E. Pictures or Wall Hangings
F. Lamps
G. Bookcase or files of Foods Products Pamphlets and Cookbooklets

It is hard to estimate the cost of establishing a new Home Service Department. Using old furniture and repainting it and similar economical measures will help keep the expense down. Approximately $700 to $1000 will cover the cost of equipping a small department, but that does not include any alterations or redecorating, carpenter work or anything of that sort. The larger utility may spend many times that cost. The budget figure for building and equipping a new Home Service Department must necessarily be large in proportion to the budget itself, but since this expenditure is for initial cost and will not have to be repeated for several years, then only partially for redecorating and a few new pieces of equipment, it is not as expensive as it seems at first glance.

When the department is complete with personnel and equipment, the work is planned.

Home Calls as follow-up on appliance sales
1. Adjustment of range
2. Cleaning of burners
3. Care of enamel
4. Checking and use of heat control
5. Bake in range if advisable
a. Trace house piping to meter
b. Watch meter slow down when control functions
c. Teach meter reading
d. Proper size pipe connections
6. Adjustment of water heater
a. Drain water from tank bottom
b. Explain how thermostat prevents sediment
c. Copper tank
d. Insulation around tank
7. Examine other gas appliances
8. Chimney Drafts
a. Draft Divertors
b. Dampers

(To be concluded in November issue)



Silent Salesmen

By Ray Martin

Director of Display, Consolidated Gas Company of New York

MR. EXECUTIVE; did you ever think how many appliances would be sold if your showroom had no salesmen? This thought is not far-fetched. Rather, it demands your consideration because you may be doing the very same thing in your show windows.

Gas appliances do not sell themselves. The presence of your own floor salesmen attests to this fact. These men are trained to sell. You would not have them otherwise. Naturally, you would not dream of putting an office boy in charge of your sales floor but you do the equivalent by placing appliances in your show windows with nothing more than the puny salesmanship that one, two or a hundred signs are capable of. Why?

Progress

Within the last ten years this total lack of coherence or agreement has been met by progressive gas companies. Each window is now provided with a silent salesman. These salesmen, for they are just that, are called Window Display Advertisements. Two are reproduced on this page for your perusal. Each is driving home one of the several important features of the some appliance. They are *selling* gas refrigeration just as surely as the one who will ultimately get credit for taking the order. And remember, Window Display Advertisements work for you without salary. They are on the job every day in all kinds of weather—never sick. They usually work fifteen hours a day. Their creation represents only a fraction of what it costs to train floor salesmen. You cannot afford to be without their help.

There are many types or grades of window display advertising just as there are many kinds of floor salesmen. Only the best are cheap because these alone produce results. The two advertisements reproduced are worthy of your consideration because each expresses a clear, concise idea that can be readily grasped and remembered. "One simple gas flame—makes endless, noiseless cold" is expressed by a simple, forceful design. The rendering is a form of German poster technique. You will note that no meaningless frills are added. They would only distract the observer and detract from an otherwise excellently designed advertisement.

Modern Design

"Silent and a safe place for baby's food —is the gas refrigerator," possesses a charm that only a baby could give it. You can imagine how many mothers and fathers passed this silent salesman without pausing to see the sleeping tot— and, incidentally, to learn something about a gas refrigerator. The design of this advertisement, like the refrigerator itself, is modern but in no sense can it be considered as exaggerated or grotesque. Rather, it harmonizes with the lines of the appliance thus becoming an inseparable part of it.

Gas appliances do not sell themselves. They must be sold by a well organized sales force. Window Display Advertisements are rightly an integral part of this sales organization. Use them to blaze the way for your floor salesmen by creating the initial desire for your appliances.

Gas Stoves Not A Part of Real Property

Other Court Decisions of Interest to Gas Men

By Leo T. Parker

IT is important to know that, while valid provisions in a conditional contract of sale are enforceable between the contracting parties, in many instances such provisions are *not* effective with respect to third persons.

For instance, a gas company which sells an appliance and installs it in a house, may make a valid agreement, *with respect to the purchaser,* which entitles the company to remove the appliance if the buyer refuses to pay for it. However, if the thing sold is a legal "fixture" and a third person holds a mortgage on the house, the latter may prevent removal of the fixture from the building, irrespective of the agreement between the contracting parties.

On the other hand, if the thing sold is *not* a legal fixture but a chattel, no one can prevent the gas company from removing it from the building if the purchaser breaches the conditions of the contract of sale.

For instance, in Madfes V. Beverly Development Corporation, 166 N. E. 787, it was disclosed that a gas company sold to the owner of an apartment building several gas stoves under an agreement which permitted the former to remove the stoves from the building if the purchaser failed to meet the agreed payments therefor. Each range was attached by a simple coupling to the gas service pipe which delivered gas to the various apartments. Thereafter the owner of the building executed and delivered another mortgage upon the apartment house.

When the owner of the building failed to pay for the stoves, in accordance with the terms of the agreement, the gas company attempted to remove them from the house and the mortgagor filed legal proceedings to prevent the removal on the contention that the stoves were legal fixtures. However, the Court held the gas company entitled to remove the stoves, stating the following important law:

"Certain chattels have such a determinate character as movables that they remain *personal property* after their annexation to real estate, *independently* of any agreement between the owner of the chattels and the owner of the realty which so provides . . . . Other chattels, such as the brick, stone, and plaster, placed in the walls of a building, notwithstanding an agreement to the contrary, *conclusively* become real estate after annexation thereto . . . . This doctrine was that it is *not* 'where the subject of annexation is such that . . . . where the property could not be removed without practically destroying it, or where it or part of it, is essential to the support of that to which it is attached' . . . . Gas ranges, *independently* of an agreement to that end between buyer and seller, retain their character as personalty, after annexation . . . . According to our view of the evidence, these ranges were not so 'attached' to the building that, as matter of law, they became part of it."

Negligent Employe Injured While Performing Heroic Act Entitled to Compensation

Ordinarily, an employe who is injured while carelessly or recklessly performing his work is not entitled to recover damages from his employer. However, if such recklessness results from the employe's desire to save others from injury or safeguard his employer's property, the Courts hold that the employe is entitled to recover damages for the injury thus sustained.

For example, in Mead v. Chickasha Gas Co., 278 Pac. 286, it was disclosed that gas company employes were repairing gas lines to prevent the escape of gas through leaks at numerous joints thereof. In order to repair the leaky joints the employes adopted the plan of sinking test holes to the defective joints for the purpose of determining whether the loss of gas at such points was substantial.

A motor truck operated by gas company pipe welders ran into one of the test holes and upset an acetylene tank. The employe obserbed that the position of the water and carbide in the tank was reversed, and knew that the water would come in contact with the carbide and be likely to cause an explosion. He realized that such explosion was highly dangerous and that several nearby workmen and citizens would be injured. Therefore, he rushed to the inverted tank and while attempting to close a valve to avert disaster, the tank exploded, lacerating, breaking, and permanently injuring his left hand and arm. Also, the sight of his eyes was permanently injured.

The employe sued the gas company for compensation. The gas company attempted to avoid liability on the contention that the employe was reckless in attempting to recover the acetylene tank when, to save himself, he should have run away. However, since it was shown that the employe performed the reckless act to prevent injury to other persons in close proximity to the test hole, the higher Court reversed the lower Court's decision and held the employe entitled to compensation, saying:

"All of the evidence shows that plaintiff (injured employe) did not have a dime invested either in the acetylene tank, the oxygen tank, or their contents, or the truck bearing the same, or the other equipment therewith. His statement, therefore, that, while he knew the danger, the preservation of the lives of others, as well as the preservation of their property, was uppermost in his mind, is all the more credible and convincing. And the law in such case has always been and should always be that, where one under stress, when put suddenly in peril, acts upon impulse and follows those instincts which are highest in humankind—to save others—he will not thereby, as a matter of law, preclude himself from asserting his rights as against those who have made such a commendable but disastrous, choice necessary."

Workmen's Compensation Laws Cannot Be Waived

It is well to know that in the majority of states employers are not permitted to settle a claim for injuries, unless the terms of the settlement conform with the provisions of the Workmen's Compensation Laws.

For illustration, in Comingore v. Shenandoah Co., 226 N. W. 124, it was disclosed that the dependents of a deceased workman, who was killed while performing his regular duties, compromised with the company for $4,500. This settlement was approved by the Industrial Commission.

However, in view of the fact that this amount was less than that specified in the compensation laws, the higher Court held the agreement void, stating the following important law:

"In law no contract, rule, regulation, or device whatsoever shall operate to relieve the employer from any liability created by the Workmen's Compensation Act . . . . It is further provided that no employe or beneficiary shall have the power to waive any of the provisions of this act in regard to the amount of compensation which may be payable to such employe or beneficiary, to whom the act applied . . . . The Industrial Commissioner has power to approve an agreement only when the terms of such agreement conformed to the provisions of the act."

Positive Testimony Necessary to Prove Source of Injury

Generally speaking, a gas company is not liable for payment of compensation for an injury sustained by an employe, unless the testimony proves *conclusively* that the injury was sustained while the workman was performing some duty *within the scope of the employment.*

For instance, in Berry v. Industrial Commission, 167 N. E. 26, it was disclosed that an employe, while using a hammer and chisel, was struck in the eye by some particles of foreign material. He consulted a physician who removed particles from his eye. Several days later while chiseling a bolt on his own automobile a piece of steel lodged in his eye, and he again consulted a physician. Soon afterward his eye became infected and it was necessary to remove it.

He sued the employing company for damages contending that the injury resulted from the first accident which occurred while he was engaged in his regular employment. However, the Court held

the employe *not* entitled to compensation, saying:

"The evidence fails to satisfactorily show that the loss of Childs' (employe's) left eye resulted from an accidental injury which arose out of and in the course of his employment."

Legal Interpretation of "Expense of Operation"

In Leonard v. Prater, 18 S. W. (2d) 681, a gas lease contract provided that the owner of the land should receive one-eighth royalty on the gross production of oil and "⅛ net proceeds of all gas sold from each well where gas only is found," and further that lessor (owner of land) be paid the first five thousand dollars produced, except that the *expense of operating* the lease shall be deducted before said lessor shall receive said five thousand dollars in oil."

The gas company contended that the term "expense of operating," as used in the lease with reference to payment of $5,000 out of the first oil or gas produced was commonly understood by operators to include all expenses of equipping the land, drilling, maintaining, and operating the lease.

However, it is interesting to observe that the Court held as follows:

"The term 'expense of operation' has a well defined and accepted meaning with regard to production of oil or gas in paying quantities. In that regard the term has been held to only include actual cost of operation, without taking into consideration the cost of drilling the well itself."

Also, in Aycock v. Paraffine Oil Co., 210 S. W. 851, it is held that the words, "in paying quantities" means that the quantity discovered must be sufficient to pay the lessee a profit, though small, over operating expenses, although it may never repay the cost of the well and its operation, and, as a whole, may result in a loss to the lessee.

Truck Driver Personally Liable for Injury to Helper

Occasionally we discover a higher Court case having a termination destined to influence motor truck drivers to exercise greater than usual care to prevent injuries for which the gas company ordinarily is liable in damages.

For example, in Dyer v. McCorkle, 274 Pac. 587, a truck driver named McCorkle desired assistance and he hired a boy 12 years old. He paid the boy no regular wage for the assistance. The testimony discloses that once he gave the boy 50 cents and on occasions smaller amounts. Occasionally McCorkle would buy candy for the boy.

One day while the boy was running toward the truck, the driver started while the boy was still some four or five feet away. In attempting to board the moving truck the boy slipped and fell under the vehicle. His parents sued both McCorkle and the company for damages. It is interesting to observe that the Court held McCorkle *personally* liable, and relieved the company from liability, saying:

"As between the infant and the company there was no appointment or contract of apprenticeship, express or implied, oral or written; nor was there any authority, express, implied, or incident to the performance of his duties, that empowered the driver, McCorkle, to create, as between the infant and the company, the relation of master and servant or employer and employe . . . . The work of the truck driver was menial work, as the term goes. Surely it is demonstrated that it was not work that required assistance . . . . Therefore, being neither an employe, nor a licensee, nor invitee, there is but one other status in which he can be placed, and that is he was a trespasser as far as defendant company was concerned. As such trespasser he was entitled to protection from wilful or wanton injury . . . Seeing the boy in a dangerous position, he (McCorkle) would not be permitted, ruthlessly and with no regard for the boy's safety, to run him down."

City Gas Company Not Liable for Explosion

Generally speaking, a municipality is liable in damages for any and all injuries caused by leakage of gas from its pipes, provided failure to discover the leakage resulted from negligence of its employes. However, positive testimony proving such negligence must be introduced, otherwise the city is not liable.

For illustration, in Phillips v. City of Alexandria, 123 So. 510, it was disclosed that the city of Alexandria distributes and sells natural gas for domestic and other purposes, its distributing system consisting of mains, pipes, meters, cut-offs, etc.—all owned by it.

One day the owner of property struck a match, preparatory to lighting a stove, when a gas explosion took place which wrecked the house, killed one of the inmates, and seriously injured two others.

Suit was filed against the gas company for damages. During the trial testimony was introduced showing that the owner of the property had employed a plumber to pipe the building but under a permit granted by the city. Later the house was partially burned and was immediately rebuilt under a permit issued by the city building inspector, although no permit was applied for or granted by the gas department for repairs, changes, or additions to the gas plumbing, presumably because the house was burned only to the floor and it was found that the gas piping was left uninjured.

When the work was completed the owner requested the city to turn on the gas. Afterward the owner thought she detected escaping gas and testified that she telephoned the gas company requesting inspectors to come and investigate. This conversation over the phone was corroborated by two witnesses who heard the owner talk. The city employes testified that no such telephone call was recorded. Therefore, the Court held the city not liable, saying:

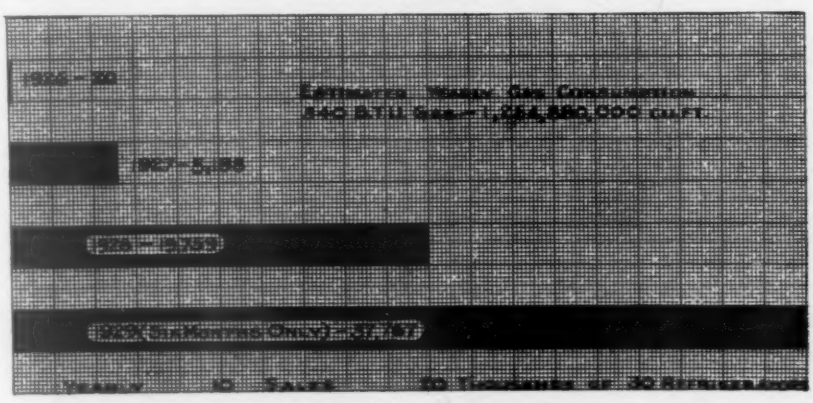
"It is conceded that, in distributing and selling natural gas to its inhabitants, the city of Alexandria was exercising a private, corporate function and therefore was on the same footing in law as an individual or private corporation, and is liable for damages occasioned by the negligence of its agents and employes. . . . In order to fasten liability on the defendant (city), it is alleged, that the city had actual knowledge prior to the explosion that gas was escaping into the house in some manner unknown to the occupants, and that no effort was made to stop the flow. But they (injured persons) failed to prove that. . . . We think Mrs. Brook (owner) was given the wrong number by the telephone operator, and that as a matter of fact she did not talk over the telephone to any one connected with the gas office."

Duty of Owner of Oil and Gas Lease

In W. T. Waggoner Estate v. Sigler Oil Co., 19 S. W. (2d) 27, suit was filed on an oil and gas lease contract which did not include the obligations of the lessee in the event oil and gas were discovered in profitable quantities.

The higher Court clearly explained the lessee's legal duty, as follows:

"Where a lease provided for oil or gas royalties, and failed to define the lessee's duty as regards development after discovery of paying oil or gas, the law implied the obligation from the lessee to continue the development and production of oil or gas with reasonable diligence . . . . The usual remedy for breach of the lessee's implied contract for reasonable development of oil and gas is an action for damages, though, under extraordinary circumstances—where there can be no other adequate relief—a Court of equity will entertain an action to cancel the lease in whole or in part."

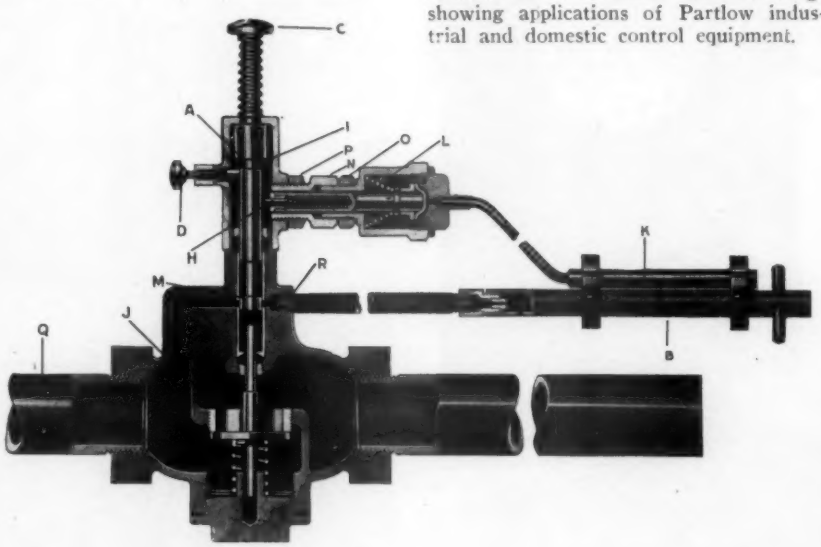


Great growth in Electrolux Refrigerator Sales

Equipment News

Industrial and Domestic Safety Pilots

The Partlow Corporation of Utica, New York, recently developed a series of industrial and domestic safety pilots, which are claimed to be especially quick-acting. These pilots are universal in application, because of their flexible tubular elements. They are designed to control the main burners, as well as the pilots. The "shut-off" action of these new controls, is adjustable for any desired speed of action from one second to several minutes. The principal of operation of these universal safety gas valves and pilots, depends on the heating of the hermetically sealed mercury element by a small gas pilot. When this element is heated by the pilot, the gas valve remains open. If for any reason this pilot becomes extinguished, the mercury contracts and the gas valve automatically releases to instantly shut off the gas.



This is accomplished in the following manner:—To light pilot push down on "C" as far as it will go; this will allow "D" to lock into recess "A" and hold plunger "C" so that the gas for the pilot may be lighted. Allow a few minutes for pilot "B" to heat up the mercury bulb "K". Then pull out "D" (holding down "C" so that it cannot shut off the pilot flame) and push down on "C" as far as it will go. This allows plunger "H" to lock into plunger "C" at "I" which in turn opens main gas valve "J" and holds this valve open until pilot light is extinguished or main gas line is shut off for any reason whatsoever.

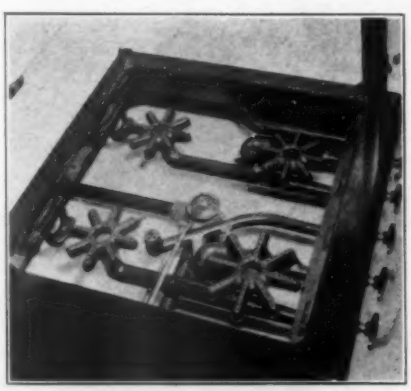
The opening of the main gas valve "J" permits gas to flow to the main gas burner where it is ignited by the constantly burning pilot light.

Should the main burner or pilot light become extinguished the thermostatic metal cools and contracts, which allows spring "L" to pull plunger "H" from recess "I"; this in turn releases plunger "C", which shuts off main gas valve "J" and pilot valve "M". Neither one of these valves will remain open until you reset and relight pilot light as in the beginning, it is stated.

A description of the valves is given in the new booklet issued by the Partlow Corporation. The booklet contains a number of illustrations and drawings showing applications of Partlow industrial and domestic control equipment.

New Klixon Safety Pilot

Another indication of the trend of the industry toward equipping gas ranges with safety devices came from Cambridge, Massachusetts, this month when the Spencer Thermostat Company released samples of a new KLIXON Safety Pilot suitable for the top burners of gas ranges. The announcement of this new development of a Safety Pilot confirms the judgment of those engineers who have been predicting that Safety Pilots will be a common sight on the 1930 models of many stove manufacturers, particularly those who are sending their ranges to the large metropolitan centers.

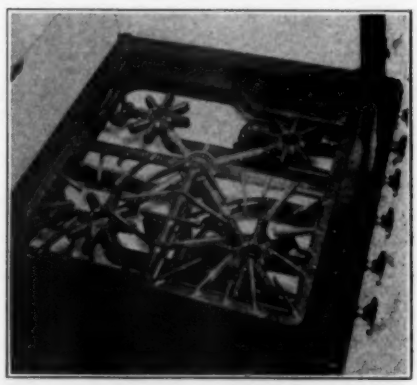


Typical Range Showing Installation of Klixon Safety Pilot

As for the device itself, the left hand illustration shows the arrangement of the piping and the position of the pilot on a typical range, where the oven is on the right hand side of the stove. Had the oven been on the left hand side, or had there been no oven at all, a slightly different piping arrangement would have been used, but this photograph serves to show the important details of installation.

As long as the pilot is burning the heat from the flame keeps the main gas valve open and supplies fuel to the range, but if for any reason the pilot is extinguished, the main gas valve will close in a few seconds and prevent any further gas from flowing into the range burners or the Safety Pilot.

Another interesting thing in connection with the KLIXON Safety Pilot is the ease with which it may be used with a flame spreader. When this has been done, as shown in the right hand illustration, the lighting of the range burners becomes wholly automatic, that is, the opening of the proper gas cock automatically lights the desired burner.



The same range with Safety Pilot and Roberts Flame Spreader for automatic lighting of top burners

The Spencer Thermostat Company is not a manufacturer of flame spreaders, consequently they have designed their pilot to work equally well with all types that are now on the market.

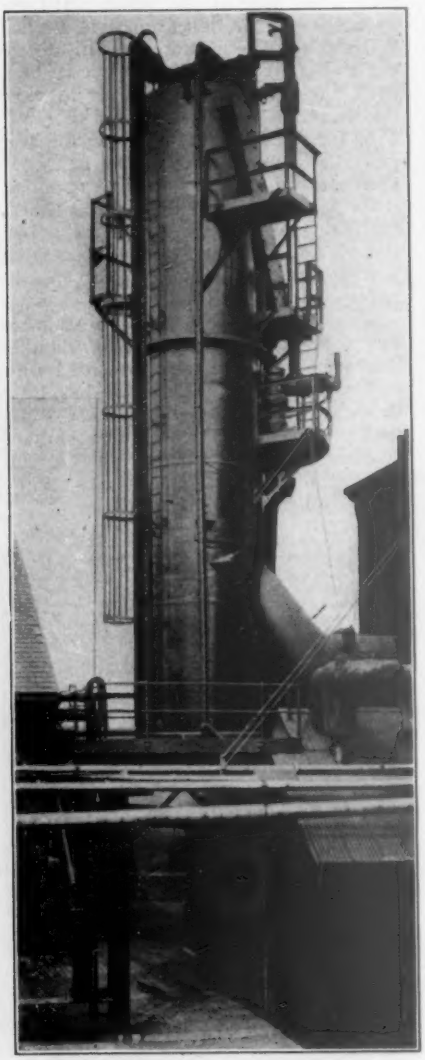
The Spencer Thermostat Company announce that they are willing to do the necessary piping and fitting to provide a working demonstration for those gas range manufacturers who are interested in seeing a Safety Pilot and flame spreader in operation on their range.

The Value of Insulation

The accompanying illustration shows the first LaMont waste heat steam generator installed at the Everett Plant of the Boston Consolidated Gas Company. It is used to utilize the heat formerly lost when hot gas was blown off. Blow off periods were for one and three quarter minutes out of every four.

The generator was insulated with Johns-Manville asbesto sponge felted and

85% magnesia block insulation, which produced excellent results with this installation. This installation shows how difficult insulation problems can be met.



Lamont Waste Heat Steam Generator

The Johns-Manville Company, New York, have a corps of insulation engineers, the services of whom are at the command of gas companies to solve any insulation problems.

New Recording Psychrometers Catalog

The Bristol Co., Waterbury, Conn., have issued a new catalog describing and illustrating their complete line of Recording Psychrometers.

The success of important processes in many industrial plants depends largely on the humidity of surrounding atmosphere. The use of these instruments make it possible to determine at any time the relative humidity or atmospheric moisture.

These instruments consist of two complete recording thermometer systems, including two sensitive bulbs and two pen-arms mounted together in one case, and arranged to record on the one chart. One system records the temperature of a dry bulb or atmosphere. The other temperature of a bulb kept moist and known as the wet bulb.

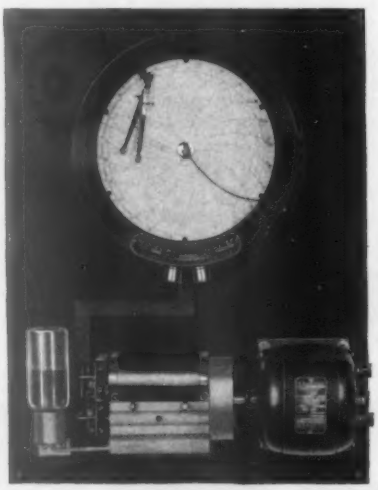


Figure 1

Illustration No. 1 shows the self-contained type recording psychrometers, which is designed for use where the instrument can be mounted at the exact location where it is desired to record the relative humidity. Illustration No. 2 is for installing in connection with kilns, drying rooms, etc., where the bulb and instrument can be located several feet apart. Their various types of instruments are illustrated as well as a number of charts and tables. A copy will be mailed on request.

Figure 2

New Armstrong Pipe Vises

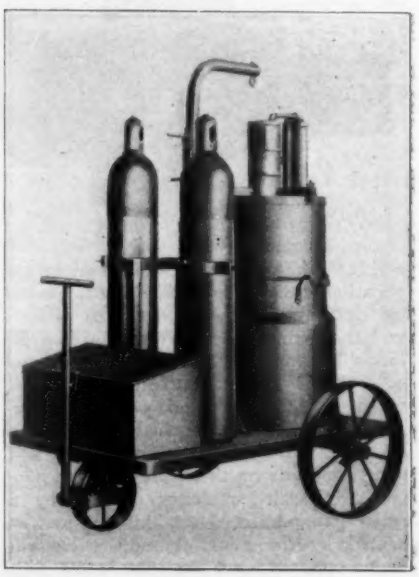
The Armstrong Manufacturing Company, Bridgeport, Conn., recently brought out a new series of hinged pipe vises. These vises which are guaranteed are of light weight but are designed for heavy work.

It is stated the locking hook will withstand any required pressure and a distinctive feature is a one piece slide which permanently holds the upper jaw in place, thereby obviating its loss. Every vise is made of malleable iron. The screws and handles are turned from selected steel. The jaws are made of special tool steel, hardened and tempered for long use. All parts are interchangeable.

These vises come in 3 patterns, The Standard, The Heavy Duty and the Kit type.

Two New Trucks for Carbic Generators

The Oxweld Acetylene Company, 30 E. 42nd Street, New York City, has recently introduced two new types of trucks to accommodate Type CLP-3 and Type CLP-2 Carbic low-pressure acetylene generators, respectively.

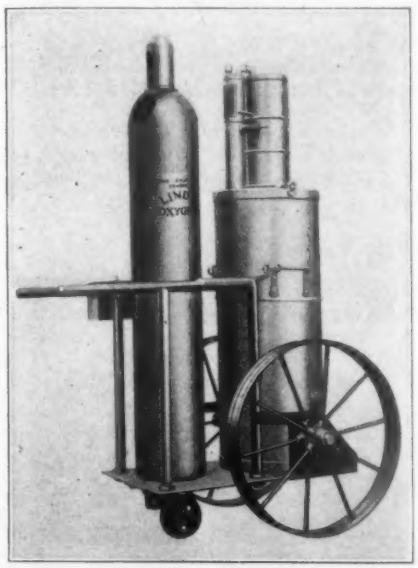


Truck for Model CLP-3 Carbic Generator

The truck designed to carry a CLP-3 Carbic Generator also carries two cylinders of oxygen. It is sturdily constructed throughout and oxy-acetylene welded. Two large wheels carry the back part of the truck; a third wheel, in the front, is of the castor type and allows the truck to be turned in a radius about equal to its own length. The generator is secured to the steel deck of the truck by means of angle iron braces and two long bolts which are inserted in the handles of the generator and tightened by means of turnbuckles.

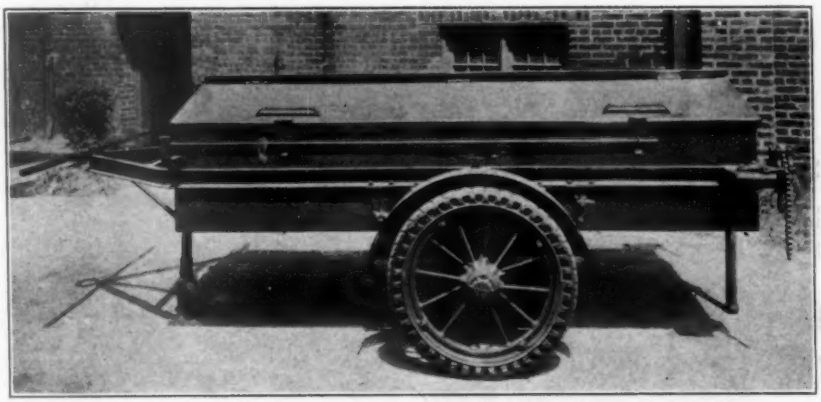
The truck is provided with a steel tool box with loop fastenings for wrenches, small tools, or for a welding or cutting outfit. The oxygen cylinders are chained to a steel rack which is fastened to the deck of the truck beside the generator. A sturdy crane is provided to be used in charging and emptying the generator.

With this crane it is an easy matter to lift the gas-bell out of the generator. The water and residue can then be drained off through the outlet at the bottom. The crane jib is made in three sections which can be telescoped when not in use to decrease the height. The truck has two 24-in. steel wheels with 3-in. tires, and a castor wheel which is 12 in. in diameter by 2 in. All wheels are provided with grease cups for lubrication.



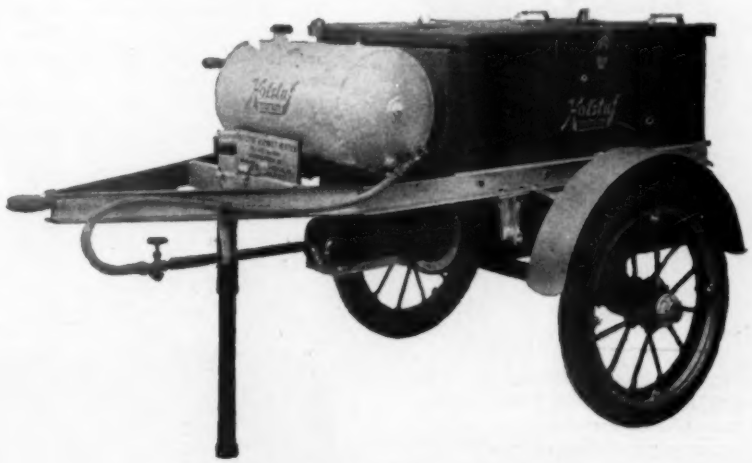
Truck for Model CLP-2 Carbic Generator

The smaller truck will accommodate one cylinder of oxygen in addition to the Type CLP-2 Carbic Generator. It is designed for extreme portability and can be wheeled anywhere with ease. There are two 24-in. steel wheels and one 5-in. castor wheel operating on a roller bearing. All wheels are provided with grease cups for lubrication.



Mohawk Hi-speed Trailer Tool Box

standard stock size is 7 feet long, 36 inches wide, 24 inches high. There are sliding trays full length of the box, 12 inches wide. Inside of main body and cover are fitted up with brackets for sharp edged tools, Red Cross kit and records. Descriptive matter will be sent on request.



Mohawk Asphalt Heater

New Asphalt Heater and High Speed Trailer Tool Box

The Mohawk Asphalt Heater Company, Schenectady, New York, have put on the market an oil burning asphalt heater with elevated melting chamber for heating bitumens for gas main coverings. It is equipped with cushion tires, compounded to stand high temperatures. The oil tank is galvanized inside and out and tested for 60 pounds working pressure.

This heater is used extensively by the Gas Companies and Pipe Line Contractors to help solve the problems of pipe line corrosion by being able to heat bitumen up to the proper working temperature, assuring the necessary adhesion between the pipe and the coating.

The Heater is manufactured in several sizes and designed to meet the requirements when fast melting, perfect temperature control, high speed trailing and rugged construction are desired.

The company also makes a high speed trailer tool box. The main body of the

New Dangler Gas Range

The new Dangler gas range manufactured by the American Stove Company includes a number of features. Among these are a new Chromium-plated Lorain oven heat regulator, in which no bi-thermostatic metal is employed. The range has concealed flue connection and a maximum of oven space. The hinges are concealed and it is thereby claimed that the range is made easier to clean. The doors are one-piece and there are no unsightly nuts and bolt-heads. Gas cocks are adjustable and are of the new "pin-less" type of construction.

These ranges, which have Angliron cooking tops have been proved by the A. G. A. Testing Laboratory and are equipped with one giant and three regular star-shaped top burners with simmering burner.

Further information will be sent upon request to American Stove Company, Dangler Division, Lorain, Ohio.

New Dangler Gas Range

Time-O-Stat Controls Company Announces a New Type Electric Gas Valve

The Time-O-Stat Controls Company of Elkhart, Indiana has developed a new type of electric gas valve. According to Time-O-Stat Engineers it makes possible silent control of all low pressure gas-fired equipment, when used in conjunction with a room thermostat.

Time-O-Stat Control

Moving parts have been reduced to a minimum. No gears or levers are employed. No intermediate relay is used, eliminating a heretofore common trouble.

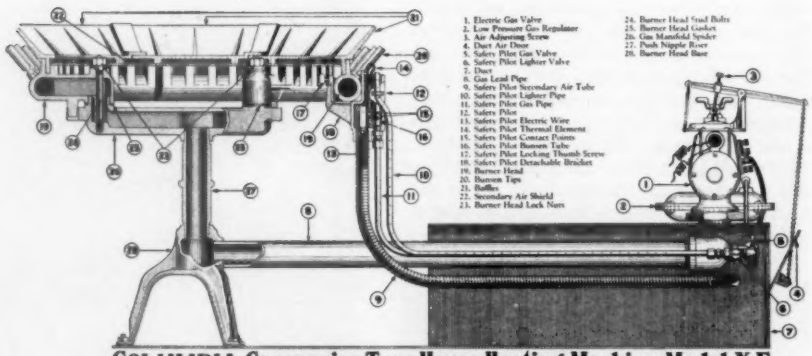
A gas-tight case encloses the valve, preventing any possibility of gas leak. All electrical controls are on the outside of this case. Contacts in turn, are protected by an outer case, attractively finished in black enamel. Smaller, more convenient in size than the older models, it is easier to install.

It is the most recent addition to Time-O-Stat's long list of automatic control instruments, perfected in Time-O-Stat's research laboratories under actual working conditions: several other automatic controls are being developed, and as rapidly as they prove their dependability will be announced to the gas industry.

Columbia Conversion Type Gas Burner

The Columbia Burner Co., Toledo, O., manufacture the Columbian conversion type gas burner, designed to use either manufactured or natural gas. A diagrammatic view of the burner is shown here.

The special features of the burner as stated by the manufacturers are as follows: An air cooled safety pilot and lighter, which needs no adjustment and which has but one moving part. Adjus-



COLUMBIA Conversion Type House-Heating Machine Model X-E

table baffles which need no replacement. Bunson tips so arranged that flame impinges on side wall of firebox. Secondary air control and distribution. A single duct-base assembly for all sizes of burner heads both round and rectangular. Discriptive literature will be mailed on request.

Stat-Amatic Instrument & Appliance Company Issue Folder Describing Temperature Regulator

The Stat-Amatic Instrument and Appliance Co., Hartford, Conn., have issued a folder describing the Stat-Amatic temperature regulator.

It is equipped with a self-winding clock—which is electrically wound—not electrically operated. It will not stop even though the current should temr porarily fail. Never needs winding! It is fifteen-jewel watch that is kept wound to full tension by an electric motor—the same motor that automatically operates the gas valve of the furnace.

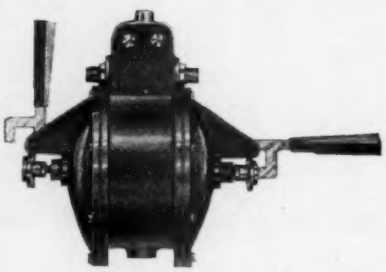
Stat-Amatic Temperature Regulator

The motor is unique—has no revolving parts—no brushes, no make or break contacts, nor revolving armature. Consumes little current. Runs only during the time it is opening or closing the gas valve. Due to low voltage operation the cost of running metal clad wire from meter board to motor is eliminated.

The "Changeulator"

The Sprague Meter Co., Bridgeport, Conn., have issued a booklet entitled "Bottled Gas an Ally of the Gas Industry". It has chapters on "Bottle Gas", "Bottled Gas Stoves", "Bottled Gas and the Stove Manufacturer" and lists the problems that arise in handling this type of fuel.

For the solution of many of these problems, they have designed a bottled gas regulator, which they call the "Changeulator". It serves also the additional purpose of closing an exhausted container

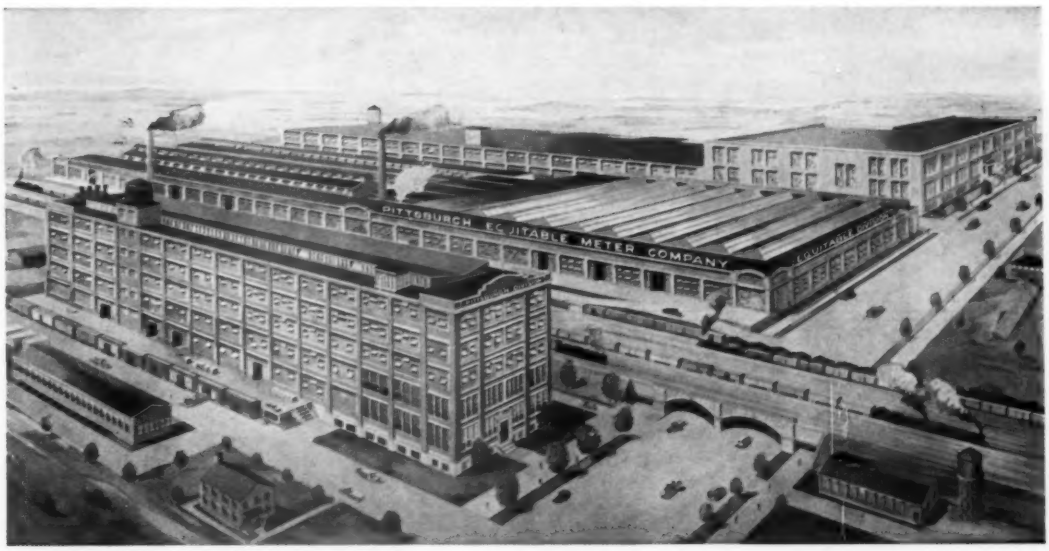


Changeulator Regulator

and turning on a full one, either automatically or manually. When it is desired that user change tanks manually, the operation is simple and makes it impossible for the user to make a mistake and open both tanks at the same time. By a slight change in adjustment the regulator becomes automatic.

To meet the demands of the bottled gas industry, the company has equipped their standard cast iron meters with a special index reading "Bottled Gas Units", each unit being equivalent to ten cubic feet. With the extension of gas mains the only change necessary in the meter is to change the bottled gas unit index to a standard index. Two tables are included showing the properties of two commercial grades of liquefied petroleum gas adaptable to bottled gas use. A copy of booklet will be sent on request.

EMCO — Wherever You Go



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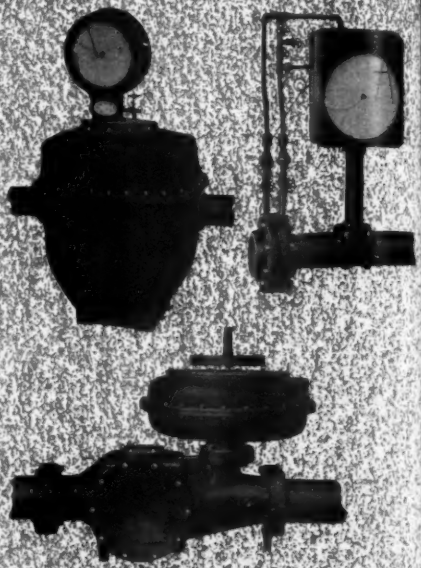

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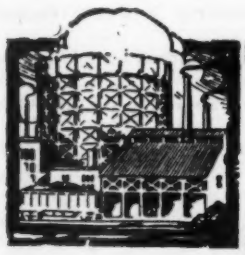
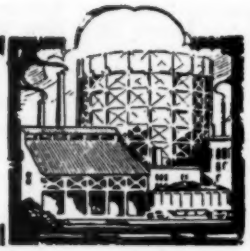


NEWS OF THE GAS INDUSTRY



Dallas Gas Company Replacing Mains

More than $150,000 is being spent by the Dallas (Tex.) Gas Company in replacing approximately 23,500 feet of gas mains in order to take care of the present and anticipated population of the city of Dallas for the next five years. The program, which is one of the most ambitious ever undertaken by this company in preparing for future development encompasses more than twelve major projects. Nearly one-half of the replaced construction is sixteen-inch mains.

At the same time the Lone Star Gas Company is constructing a 20-inch trunk line into Dallas which, when completed, will deliver approximately 100,000,000 cubic feet of gas per day into Dallas from the new gas fields in the Panhandle district near Petrolia.

The construction program will be completed in ample time to take care of increased production with the approach of cold weather, according to R. M. Redding, general superintendent of the Dallas Gas Company.

Kansas Pipe & Gas Now Building a New Line

The Kansas Pipe Line & Gas Company, a subsidiary of the North American Light & Power Company, is now engaged in the construction of a sixteen-inch line from the natural gas field in Barber county, southern Kansas, to a point near Hutchinson, a distance of around seventy-five miles. At Hutchinson it will tie in with the Company's present lines. This new line will make available an increase of 100,000,000 cubic feet open flow per day, and will amply take care of the consumer's demands which have been increasing from time to time as new communities have been added. The line will be operated at a pressure of from 600 to 650 pounds.

Work is progressing rapidly, from a mile to a mile and a half of pipe being laid daily, and it is expected that it will be finished well before the end of the year. In a short time the line will be extended from Hutchinson to McPherson, replacing the present eight-inch line between the two points. At McPherson it will connect with another sixteen-inch line which is now under way northeastward to Abilene.

The Kansas Pipe line & Gas Company owns the rights to the gas from the present wells in Barber county, and other wells are now drilling. The present sources of natural gas of the Kansas companies are the McPherson field, the Barber county field and the fields east and south of McPherson.

Convention Calendar

October

14-18 American Gas Association, Annual Meeting, Atlantic City, N. J. Alexander Forward, 420 Lexington Avenue, New York City, managing director.

December

3-6 Gas Meter Men's Short Course, Mid-west Gas Association. Iowa State College, Ames, Iowa R. L. Klar, Chairman.

Natural Gas Company's Statement

The Oklahoma Natural Gas Corporation, a subsidiary of the American Natural Gas Corporation reports gross earnings for the six months ended June 30 amounted to $6,714,289 as compared with $6,161,465 for the first half of 1928. After operating expenses, maintenance and taxes, net operating income totaled $3,378,569 against $2,927,866.

Ark. Natural Co. Starts Construction of Large Compressor Station at Sterlington, La.

The Arkansas-Louisiana Pipe Line Company, subsidiary of the Arkansas Natural Gas Corp., is constructing one of the largest natural gas compressor stations in the world at Sterlington, twenty miles from Monroe, La. The project will cost approximately $1,000,000. The contract is being given to the Republic Construction Company of New York city. The compressor station will be used in connection with the company's new 100-mile 20-inch gas line now under construction from the Monroe and Richland gas areas to Shreveport, La., and will also be connected with the 16-inch line to ElDorado, Ark., recently acquired by the company.

Approve Exchange of Shares

Kidder, Peabody & Company of Boston, Mass., have notified preferred and common stockholders of the Massachusetts Gas Companies that having, with some friends, in September 1920, formed the Massachusetts Gas Companies and having been closely associated with that organization ever since, they approve of the recent offer of the Eastern Gas & Fuel Associates (Koppers Co. interests of Pittsburg) and believe that it is in the interest of all Massachusetts Gas stockholders to accept it. In the exchange the preferred shareholders of the Massachusetts Gas Companies for each share held would receive one share of Eastern Gas & Fuel Association 4½ per cent prior preference stock. The holders of the common shares would receive for each share held one share of Eastern Gas 6 per cent preferred and two shares of no par common.

Suspension of Gas Unit Contemplated

Suspension of the gas unit in Clear Lake, Ia., and substitution of a pipeline direct to Mason City where the People's Gas and Electric company has its power plant is considered likely following transfer of the local utilities systems to the People's Gas and Electric by the Central West Public Utilities company. Southern Iowa properties of the Peoples Gas and Electric were transferred to the Central West Public Service in exchange for the local plant, which passed to the Omaha concern six months ago.

Persons Altering Gas Meters to be Prosecuted

Persons altering gas meters or equipment of the Citizens Gas Company, Indianapolis, Ind., will be prosecuted to the limit in the future, according to C. L. Kirk, vice president and general manager of the company. The announcement followed prosecution of a case in municipal court. Many cases of gas thievery have been discovered in homes of customers of the company. The defendant in the first case the company has prosecuted for years was fined $10 and costs for having a home-made connection that gave him free gas during the entire summer.

Quincy Branch of Boston Consolidated Moves Into New Quarters

The Quincy branch of the Boston Consolidated Gas Company recently moved into new and commodious quarters. This reflects an era of public utility service that affords employment to more than 100 persons, and its net work of mains would stretch 170 miles, in comparison to the pioneer days of 1905 when but four employes comprised the personnel of the company and its mains were only 17 miles in length.

The new headquarters allow for a display of all the domestic and commercial uses of gas, commodious floor space for the office personnel on the first floor and a display of a model laundry and kitchen ranges, salesmen's headquarters and records.

In order that additional facilities may be possible for the growing needs of the company, a two story structure is being erected to be used as a service, storage and garage building.

Display floor, Quincy Branch, Boston Consolidated Gas Co.

Hearing on Proposed Indiana Utility Merger to be Opened in December

Public hearings on the proposed $70,000,000 Indiana utility merger affecting gas, interurban and power companies of the state, will be opened Dec. 2 by the Indiana public service commission. The date was set at a recent conference. Hearings will be conducted in the Senate chamber at the Statehouse. The proposed merger would direct utilities operating in approximately 284 cities and towns. It was filed by seventeen large utility corporations, several of which control smaller companies.

When all audits, appraisals and exhibits have been submitted, a recess will be given for study of the evidence by all parties. For several months auditors and engineers of the commission have been at work on surveys of the properties involved. Although no statement has been made for some time relative to progress of the field forces, it is understood that practically all work has been completed and exhibits now are being prepared for the largest case of its kind Indiana ever has seen.

The utilities involved are the Central Indiana Power Company, Indiana Gas Light Company, Noblesville; Indiana Electric Corporation, Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute Traction & Light Company, Northern Indiana Power Company, Wabash Valley Electric Company, Noblesville Water and Light Company, Colfax Electric Company, Moran Electric Light and Power Company, Mulberry Light and Power Company, Zionsville Water and Electric Light Company, Stilesville Electric Company, West Lebanon Electric Light, Heat and Power Company, West Indiana Utilities Company and the Brazil Electric Company.

Gas Service Under Way

The Colorado Interstate Gas Company will extend its natural gas pipe line from LaJunta to LasAnimas and the government hospital at Fort Lyon, Colorado, a distance of twenty-six miles. The gas is served from the Denver-Amarillo pipe line.

Natural Gas Arrives in San Francisco

Natural gas was turned on at the Kettleman Hills end of the 231-mile pipeline leading to San Francisco and Oakland recently.

Bringing natural gas to the Bay cities marks the first step in the Pacific Gas & Electric Co's. natural gas program. Its investment for this pipeline and the gas holders and equipment that go with it represents $13,000,000. A second pipeline, yet to be built up the San Joaquin Valley to Stockton, Antioch and Richmond, will cost another $13,000,000. It will connect with the first line and together the two lines will furnish such a dependable supply that it will eventually be possible to serve straight natural gas to cities and towns as well as to factories and industries. In the meantime, natural gas is available to factories along the completed pipeline up both sides of the Bay.

Holding Company Has Change in Its Name

The name of the Midland Utilities Investment company has been changed to Midland United company. Similarity of the former name with other public utility holding companies was given as the reason for the change.

The Midland United company is a holding or investment company, controlling a number of public utility companies operating chiefly in Indiana and Ohio. The principal operating companies in the Midland group are Northern Indiana Public Service company, Interstate Public Service company, operating subsidiaries of the Central Indiana Power company, Indiana Service corporation, Chicago South Shore and South Bend railroad, West Ohio Gas company and Gary Railways company.

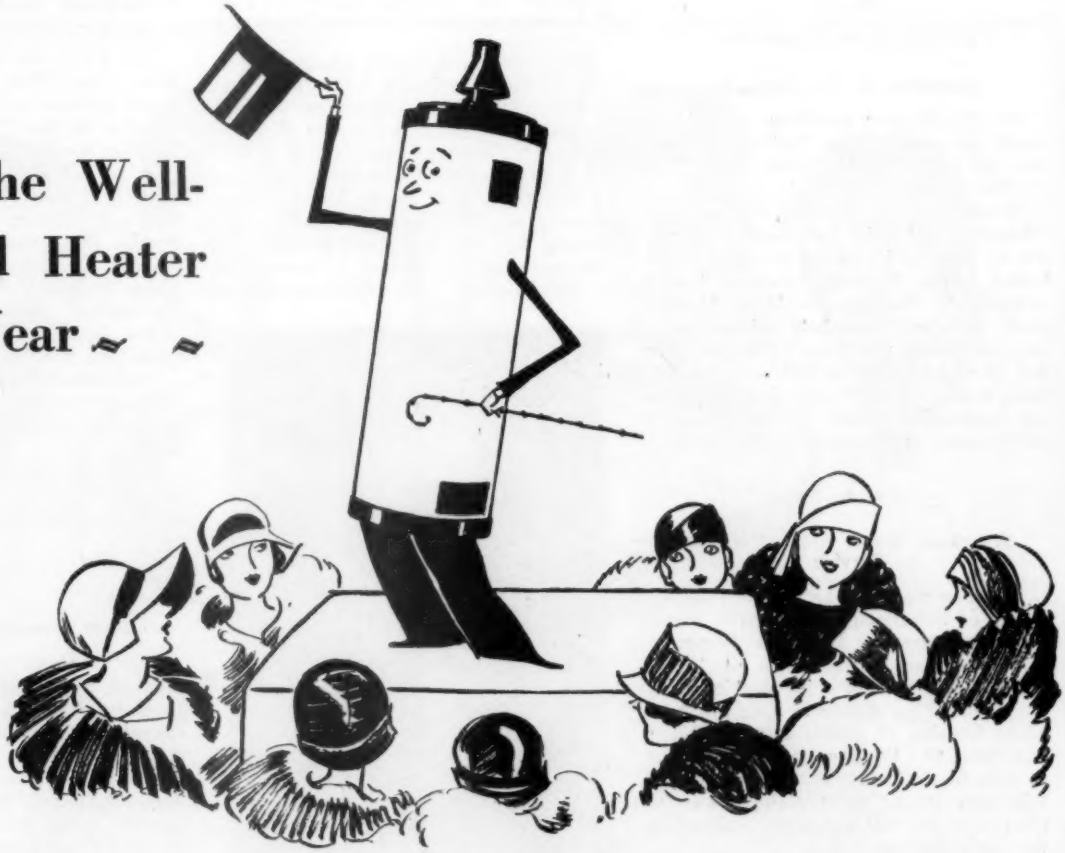
Utility Seeks Gas Franchise

The Harrisburg, Ill., City Council has under consideration an ordinance providing for a franchise permitting the Southern Illinois Gas Co. to lay mains and operate a gas plant in Harrisburg. W. H. Schott, who promoted the Southern Illinois Railway & Power Co. interurban line through Harrisburg from Eldorado to Carrier Mills, represents the company, and has guaranteed work will begin on the project within six months after the franchise is granted, with production of gas to start within a year. He will post a bond guaranteeing that he will not sell the franchise, but will complete his contract.

A referendum vote will be necessary for acceptance of the ordinance if it is accepted by the City Council. The request for the franchise comes directly on refusal of voters to allow a new power and light franchise to the Central Illinois Public Service Co.

(*News continued on page 98*)

What the Well-Dressed Heater Will Wear ~ ~



IT IS whispered about in the best Cellar Circles that more rigid requirements as to costume will be insisted upon among the elite of water heater society during this season.

In keeping with a reputation already won for being the best dressed heater, Welsbach Hotzone is appearing in a stunning buff jacket, topped by a stiff, shiny black hat, with shoes to match. He is being received in more cellars than ever before.

To quote his own words, when better cellars are made, he will help to make them.

The Welsbach Hotzone pedigree bears witness to its dependability in action, its economy and low upkeep. Every product bearing the Welsbach name has a reputation to sustain. How well the Hotzone does it is evidenced by the fact that this year, Hotzone sales have boomed to a higher mark than ever before. *Hotzone has a way with the women that appeals.*

Write for prices and discounts, and start Hotzone going throughout your territory. Welsbach Company, Gloucester, N. J. Sales Offices in Principal Cities.

Member American Gas Association

Welsbach **HOTZONE**

SELF-ACTION GAS WATER HEATERS

News

(*Continued from page 96*)

Incorporates In Colorado

W. H. Girdler, president and E. S. Graff, secretary, of the Helium Company Inc., of Louisville, Kenttucky, have filed articles of incorporation in the state of Colorado, and are erecting a plant near Thatcher, Colorado for developing the gas in that section which contains much helium. The Kentucky concern has a contract to furnish the Navy Department, four and one half million cubic feet of helium this year. The Colorado gas is said to contain 7.07 per cent helium, compared to 3.6 per cent the highest previously found. O. A. Rosebush of Thatcher is in charge of the work.

Wareham, Mass. Assured of Gas Service

An agreement has been signed by the Board of Selectmen of Wareham, Mass., and the Buzzards Bay Gas Company, which will assure the town of Wareham of gas service for its inhabitants. It is planned to start construction work about October 15, with completion about December 15. Work on laying gas mains in most of the streets in the business district and center of Wareham will be completed this Fall and then continued in the early Spring.

Negotiate for Supply of Gas

Negotiations have been started by which the Clinton, Mass., Gas Light Company will obtain its supply of gas from the Worcester, Mass., Gas Light Company, according to an announcement by Robert E. Freel, manager of the Clinton company. By the arrangement the main supply of gas for Clinton would be derived from a mammoth distributing plant in Worcester, the Clinton plant being discontinued or used only as an auxiliary. The Worcester company proposes extending its mains from Worcester, through West Boyleston, supplying the inhabitants with gas, and continue construction of a high pressure main across the causeway at West Boylston and then along the West Boylston-Clinton state highway to Clinton, connecting with the mains of the Clinton Gas Light Company.

Merger and Change of Name

The United Power, Gas & Water Corporation which controls the Federal Water Service Corporation and the Peoples Light and Power Corporation, will acquire a majority of the common stock of the Southern Natural Gas Corporation and then change its own name to the Tri-Utilities Corporation.

American Gas Association Establishes Fellowship at Johns Hopkins University

The Department of Gas Engineering in The Johns Hopkins University has recommended the appointment of Mr. Herman H. Ellerbrock, Jr., as the first American Gas Association fellow. This fellowship was made possible by a pledge of $350.00 per year by the American Gas Association. Under the terms of the fellowship, Mr. Ellerbrock will pursue graduate training and research in the School of Engineering. Mr. Ellerbrock is a

Herman H. Ellerbrock, Jr.

graduate of this school in the class of 1927. In his undergraduate work he studied Mechanical Engineering. He is also an "A" course graduate of the Baltimore Polytechnic School. He is at present employed by The Consolidated Gas Electric Light and Power Company of Baltimore and has done work of a professional nature for the Bethlehem Steel Company. He will specialize in Gas Engineering and plans to take a doctor's degree in this subject.

Gas Turned Into New Indian Gas Main

Gas was turned into one of the largest gas transmission lines in the country recently when the new line from East Chicago, Ind., to South Bend was put in operation. The new 65 mile main of the Northern Indiana Public Service company makes it possible to transmit gas from East Chicago to supply the growing needs of this community. Gas is obtained in East Chicago from the Indiana By-Products company.

The local residential and industrial need for gas had become so great that the South Bend plant could not supply the demand. To insure uninterrupted and adequate service in the future the new gas line connection between South Bend and East Chicago was constructed.

Educational Sessions on Natural Gas Prove Popular

The Utah Gas & Coke Company, Salt Lake City, Utah, recently held educational sessions in the various natural gas districts in Salt Lake City in order to acquaint the housewives with the proper uses of natural gas These meetings were held under the direction of Mrs. Luella E. Fisher, director of the Home Service Department of the Eriez Stove & Mfg. Company and chairman of the Home Service Committee, American Gas Association, assisted by representatives of the Home Service Department of the Utah Gas & Coke Company.

Demonstrations were given on how to clean burners and properly adjust mixers to get the most efficient and economical heat.

Keen interest has been shown in the advent of natural gas in Salt Lake City and the gatherings were well attended.

Court Sustains Gas Company

The Montana public service commission ordered the Great Falls Gas Company of Great Falls, Montana to reduce its rate for natural gas, November 3, 1928, but the company invoked the courts and in the United States district court at Helena, August 24 a ruling was handed down to the effect: That the demand for gas in Great Falls was such that the company had not received a fair return on its investment, that the commission must not interfere with the present rates, that perhaps later on the business may grow sufficient to warrant further investigation and a change of rates.

Mayor of Atlanta Formally Begins Work on Improving Gas Main System

Wielding a small gold spade recently, Mayor I. N. Ragsdale, of Atlanta, Ga., formally began work on improving the gas main system of Atlanta—work that will cost approximately $1,000,000.

The ground-breaking ceremonies were attended by Governor L. G. Hardman, of Georgia; R. C. Hoffman, vice-president; H. Carl Wolff, assistant vice-president; M. L. Kane, Atlanta manager, and other officials of the Atlanta Gas Light Company, and many leading bankers and business men of the city.

The work is being done in preparation for the arrival of natural gas from the Louisiana fields, and to the 450 miles of gas main already in use will be added 30 miles of twenty-inch main. Part of this will serve residents of the Peachtree district and part will form a loop line to feed the gas into all sections of this city.

In addition to serving Atlanta, the natural gas line will serve Rome, Portland, Rockmart, Cartersville, Lindale, Calhoun, Cedartown, Plainville and Adairsville.

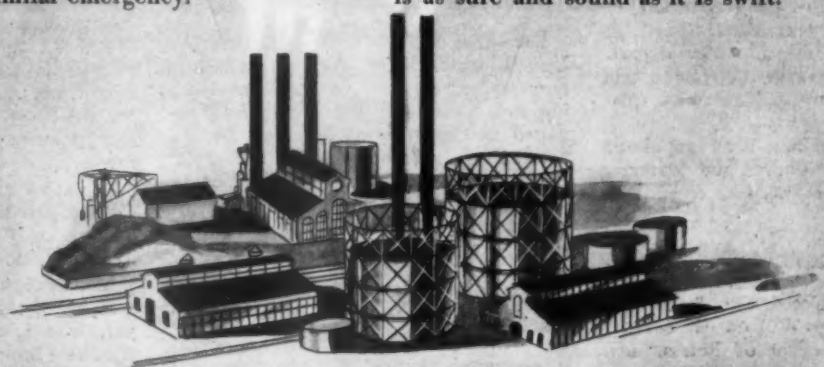
RESEARCH—*and* GAS

PERHAPS the most critical period ever faced by the gas industry was that in which Gas Light, with its brilliant past, was transformed into Gas Fuel, the new servant with an even greater future.

The program of research, now being carried out so ably by the American Gas Association, would have spared our predecessors much labor and no little grief. Having such a program in effect today is one of our best means of insurance against a similar emergency.

The fact that ours is a correlated system of research, in which all departments of the industry are interested and engaged, may be said, in fact, to place the gas business beyond the reach of ordinary emergencies. While our research efforts are coordinated, our object is diversification to the end that we may serve as widely as possible and with utmost economy to ourselves.

Meanwhile, with the help of all, we are moving forward at a pace that is as sure and sound as it is swift.



CONSOLIDATED GAS COMPANY *of* NEW YORK

GEO. B. CORTELYOU, *President*

Personals

John S. Avery was elected Vice President and General Manager of the Utica, N. Y. Gas and Electric Company at a meeting of the Board of Directors of the organization, held recently to fill the vacancy created by the resignation of F. B. Steele. He was also made a director of the Company.

Up until a short time ago, Mr. Avery held the position of General Manager both of the Metropolitan Edison Company, the largest subsidiary of the General Gas and Electric Corporation, and of the New Jersey Power and Light Company, an affiliated company.

Mr. Avery is a native of Rochester, and a graduate of the engineering school at Cornell University, Class of '99. He was at one time connected with the Charles H. Tenney and Company group in the southeastern part of the state and later was in the manufacturing business in Rochester. He returned to the public utility business in 1918 with the Mertopolitan Edison Company.

S. E. Bell, son of H. E. Bell, former chief supervisor of the oil and gas division of the Texas Railroad Commission, residing in Houston, who won honors as a debater at Texas University last year, has joined the Houston Natural Gas Company as manager of the new business application department.

William E. Leverette, formerly with the Alabama Power Company at Montgomery, Alabama, has been made Merchandising Manager for the Broad River Power Company at Columbia, S. C. Mr. Leverette has had a number of years' experience in the utility field both as an engineer and as a merchandiser.

Philip E. Loux, assistant to the general sales manager of the Pawtucket, R. I., Gas Company, recently resigned his position to enter the statistics department of the American Telephone and Telegraph Company in New York City.

Leroy S. Colby has been appointed Assistant to the President and Manager of the Lawrence, Mass., Gas & Electric Company.

P. Ralph Chambers was recently appointed manager of the Ithaca, N. Y. district of the Associated Gas & Electric System, succeeding William E. O'Neill who retired on account of illness. Mr. Chambers was local manager at Oneonta, where he is succeeded by Donald Price.

Stuart Cole, formerly office manager at the Norwich, N. Y. office of the Associated Gas & Electric System has been appointed office manager at Ithaca. He will be succeeded at Norwich by Alfred Egli.

Hugh H. Cuthrell as Acting Manager of the New Business Department of The Brooklyn Union Gas Company succeeds Prescott B. Wiske, who left on October 1st to become associated with the Erskine-Danforth Corporation of New York. R. H. Staniford and F. D. Tansey will continue as assistant managers.

Mr. Wiske, who is a graduate of Stevens Institute of Technology, had been with The Brooklyn Union Gas Company since July 1, 1911. On January 1, 1919, he was appointed manager of the New Business Department. During his management of the department its activities continually expanded and included all phases of selling, sales promotion and sales service work.

Mr. Cuthrell was born in Winston, Salem, N. C. He is a graduate of Wake Forest College and of the University of North Carolina, receiving degrees from both institutions.

Hugh H. Cuthrell

During the World War he joined the United States Naval Air Forces where he remained for four years. After leaving the Naval Air Forces, he was engaged as Construction Engineer by the South Porto Rico Sago Company in 1921. He was employed by the Kings County Lighting Company as Engineer of Distribution in 1922. He held this position until May, 1927, when he resigned and entered the service of The Brooklyn Union Gas Company as Engineer's Assistant. In this capacity, he organized the Customer's Service Division which was created to meet the increasing demands of the great and populous areas served by The Brooklyn Union Gas Company. He was transferred to the New Business Department as Sales Engineer a few months ago and in this activity he has brought to perfection a number of important changes which have been under way for some time.

N. H. Coit, General Manager of the Florida Public Service Company at Orlando, has been made General Manager of the Broad River Power Company, and will make his headquarters in Columbia, S. C.

Mr. Colt has been in the public utility field for some twelve years, and six of them have been associated with what is now the Associated Gas and Electric System.

Nelson H. Carpenter was recently appointed Superintendent of Gas Distribution of the New York Power & Light Corporation at Schenectady. Mr. Carpenter has had a varied experience with public utility work. Previous to his coming to Schenectady in August, 1928, he was engaged in gas and sales work with the Twin State Gas and Electric Company at Hoosick Falls, N. Y. Before that, he was associated with the Cambridge District of the Consolidated Electric Company as District Superintendent. Mr. Carpenter attended Rensselaer Polytechnic Institute at Troy.

Vernon V. Morris has been appointed assistant to L. R. Nichols, Division Engineer of the Glens Falls territory of the Mohawk Hudson Power Corporation System, and will have charge of gas manufacture and distribution. Mr. Morris, who has been with the company more than five years, was formerly Superintendent of Gas at Oneida, later being transferred to Schenectady just previous to his transfer to Glens Falls. Mr. Morris graduated from Catholic University in 1924.

Howard B. Churchill has been ap- General Auditor of the New York Power and Light Corporation, Albany, N. Y., the appointment being effective September 1st. Mr. Churchill has been connected with the organization since November, 1923, first entering the Auditing Department at Schenectady. From October, 1925 to October, 1927, he served as traveling auditor. He was then made Auditor of District Accounts for the New York Power, remaining in this position until his recent appointment.

A native of Mooers, New York, Mr. Churchill is a graduate of St. Lawrence University, Class of 1922, having a degree of B.S.

Mr. Churchill's appointment comes as a result of the resignation of J. E. Sawyer, who is to be connected with the Electris Bond and Share Company of New York City.

I. M. Beatty, of Ossining, assistant general manager of the Northern Westchester Lighting Company and the Peekskill Lighting and Railroad Company for the last 22 years, was recently

(*Personals continued on page 102*)

Welding and Cutting with City or By-Product Gases

WE believe that notable achievements have been made in cutting and welding with illuminating, natural and similar widely distributed gases. We are convinced from our developments that there are great possibilities in this practically unlimited field and that vast sums can be saved by this process and the art of cutting made more universal.

In order to encourage and aid the development of this art we are offering for the best authenticated results obtained by cutting or welding with such gases.

THREE THOUSAND DOLLARS ($3,000.00)

to be paid $1,000.00 each year for the best authenticated article sent to us in the years 1930, 1931 and 1932.

Particulars of the conditions under which such data must be furnished and the methods of determining the awards will be furnished upon application.

This Company will aid individuals or companies seeking to make the necessary experiments with apparatus at nominal costs and will also help to develop or finance any improved methods or systems which may warrant such development.

THE ALEXANDER MILBURN COMPANY
1416-28 WEST BALTIMORE STREET
BALTIMORE, MD.

Manufacturers
WELDING AND CUTTING EQUIPMENT
Established 1907

Personals

(*Continued from page 100*)

appointed assistant to Vice-President Stuart Wilder of Westchester Lighting Company and has been assigned to the general office building in Mount Vernon, N. Y. He will, however, retain the position of assistant general manager of the two northern companies.

Mr. Beatty, having been affiliated with the gas and electric industries in Westchester county for 33 years, has seen great changes, improvements and extensions in utility service and a constantly increasing demand for it.

Mr. Beatty's wide experience in both the gas and electric industry eminently qualifies him for his additional duties in the general office.

Kennan E. Hollingsworth, former supervisor of district representatives of the Lowell, Mass., Gas Light Company, recently took up duties with the Puget Sound Power and Light Company in Everett, Washington.

Allen R. Eckman of the United Fuel Gas Company has been appointed to membership in the Industrial, Publicity and Statistics, and Convention Committees of the Huntington Chamber of Commerce, Huntington, West Virginia.

G. C. Hyde, former Superintendent of the Florida Public Service Company, Orlando, has been appointed General Manager, filling the position of Mr. N. H. Coit, who has been made General Manager at Columbia, S. C. Mr. Hyde is a native of Chicago, but he has lived in the South for a number of years.

H. R. Cloud has been put in charge of the Merchandising Department of the Florida Public Service Company, Orlando. Mr. Cloud was formerly head of the Commercial Department, and will carry on his work in addition to the supervision of appliance sales.

Charles E. Bader was recently appointed to the position of assistant manager at the 14th Street District Office of the Consolidated Gas Company of New York. Mr. Bader has been with the company for 23 years having advanced through the various divisions of work which go to make up the Commercial and Sales Departments.

Cecil W. Brown was recently appointed Manager of the New London Division of The Connecticut Power Company.

Mr. Brown has been Chief Engineer of the Company for the past five years and Acting Manager since February of this year.

E. C. Frye, general manager of the Worcester, Mass., Gas Light Company, gave a talk on "Illuminating Gas," before members of the Uxbridge Rotary Club at a dinner in the Uxbridge Inn at Uxbridge, Mass., recently. During his talk he gave a demonstration of the making of the product with a small gas machine. The Worcester Gas Light Company will soon lay its gas mains in Uxbridge and at the close of his talk Mr. Frye held an open parliament and answered questions propounded by the membership.

P. F. Leeman, representative of the New Business Department of the Kansas City, Mo., Gas Company, was the star salesman for the month of August. His sales for the month totaled $7,992.75. During the month he sold 46 house-heating installations, besides a considerable volume of other merchandise.

Major T. J. Strickler, General Manager of the Kansas City, Mo., Gas Company was elected commander of the Missouri Legion at the State Convention of Missouri Legionnaires held at Sedalia, Mo., recently.

R. B. Duncan was recently appointed Superintendent of City District of the Philadelphia Gas Works Company, Philadelphia, Pa. C. S. Hazel was appointed Assistant Superintendent.

Scott Turner, Director of the United States Bureau of Mines, will sail from San Francisco on October tenth to attend the World Engineering Congress at Tokio. He was appointed by President Hoover as one of the five Federal engineers who are to represent the United States Government at this Congress. Mr. Turner also holds a commission to represent the American Committee of the World Power Conference, he is the official delegate of the Canadian Institute of Mining and Metallurgy at the Congress, carries credentials from the University of Michigan and also the Michigan College of Mining and Technology as official representative of those two institutions at the meeting, and is listed as a member of the official party representing the American Institute of Mining and Metallurgical Engineers. He plans to return to the United States the latter part of November.

Margaret Hutton, formerly of the Home Service Division of Consolidated Gas Company and now with the Home Service Division of Westchester Lighting Company Mt. Vernon, N. Y., has again been invited to talk over National Broadcasting Station each Tuesday at 11:45 o'clock. Her talks are on Home Making subjects, especially in the culinary art line and new and interesting recipes are given.

H. S. Patton has been appointed chief engineer of the Midland United Company, Chicago, Ill. He will have charge of all departments of the company dealing with engineering construction and operation.

Mr. Patton has been connected with the Midland Company for about six years and heretofore has been in charge of all electrical engineering.

Obituary

ROBERT LIEBER

Robert Lieber, 59 years old, a director or trustee of the Citizens Gas Company, Indianapolis, Ind., during its entire existence died of heart disease and complications. Mr. Lieber was born in Indianapolis and was educated in the local schools.

He was identified with the Citizens Gas Company from its early days. His father, Herman Lieber, had been active in the old Consumers Gas Trust Company, the distribution mains of which were taken over by the Citizens Company. Mr. Lieber became a director of the Citizens Company in the first year of its existence and succeeded the late Alfred P. F. Potts, as trustee.

As a trustee he devoted much time and attention to the company's affairs, more particularly during the last year after the question of exercising the city ownership under the 1905 franchise began to attract public attention.

CLARENCE B. STROHN

Clarence B. Strohn, aged 52 years, for many years identified with the Western United Company properties in Elgin, Ill., when they were under control of Col. Ira C. Copley, died recently. In recent years he had been vice-president of the Elgin Courier-News and the last few months acting business manager of that paper. After graduation from Leland Stanford University he joined the Western United Gas and Electric Commany became superintendent of the Elgin district, which position he held a number of years, resigning to take charge of the News, but in a few months returned to the Western United Gas at Aurora, succeeding his brother, Roys N. Strohn as treasurer. He remained as executive of the company until Col. Copley disposed of his utilities properties to devote himself to his newspaper interests. He is survived by his widow and two sisters.

S. J. Donahoe was recently appointed Assistant Secretary of the Public Utilities Consolidated Corporation, Minneapolis, Minn.

Walter S. R. Dickinson, Director of Educational Work, Commercial and Accounting Departments, Electric and Gas, of the Public Service Companyof New Jersey, resigned recently to take a position as director of personnel for a large Chicago department store.

Mr. Dickinson had been in the employ of Public Service for eighteen years, having begun his service in 1911 in the Newark Commercial office.

ORIGINAL DESIGN + EXCELLENT WORKMANSHIP + HONEST SELLING = LESS SERVICE DIFFICULTIES

No Pre-Mixer . . .

No Baffle Replacement . .

Absolutely Noiseless . . . .

Costs Less to Install . . . .

Only One Moving Part . .

Air-Cooled Safety Pilot That Requires No Service . . .

Build Your Gas Load at Least Expense

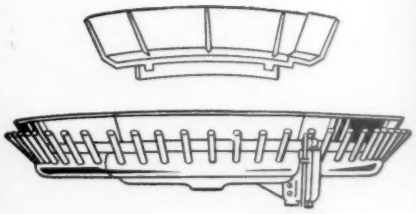
CUSTOMER SATISFACTION, plus lower installation expense and freedom from service calls, enables you to build your gas load at least cost with the COLUMBIA House-Heating Gas Machine. Absolute safety under all conditions is assured with the COLUMBIA Safety Pilot and Lighter shown and described on next page.

COLUMBIA
"The Gem of Them All"

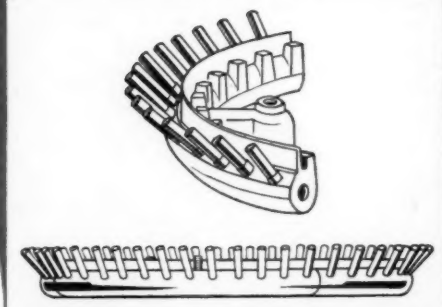
COLUMBIA CONVERSION TYPE *Gas Burner*

The Heart of the Machine

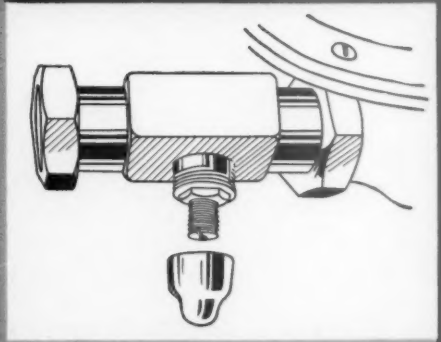
COLUMBIA Air-Cooled Safety Pilot



Baffles light in weight and never need replacement. No extra Baffle stock to carry. Baffles direct secondary air into close and intimate contact with flame tips, insuring complete combustion.

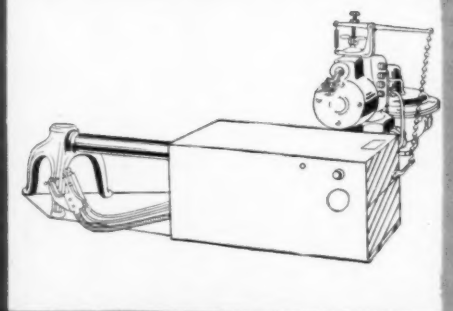


Burner Heads adjustable for height. Push Nipple Riser Joint connection from Burner Head to Duct-Base Assembly furnished in different heights without extra cost. Bunsen Burner Tips burn at low pressure and apply flame directly to sidewall of furnace.



The COLUMBIA is simple in adjustment. One adjustment for gas and one adjustment for air. No other adjustments required.

Patented Air-Cooled Pilot requires no adjustment. Moveable with Burner Head. Absolutely positive in operation. Safety Pilot Lighter attachment eliminates all lighting difficulties.



One size Duct-Base Assembly for all furnaces and boilers. Unit construction. Factory built and tested under both gas and electricity. Equipped with Minneapolis-Honeywell Electric Gas Valve.

Laboratory tests and field experience show that the COLUMBIA Burner operates with low ash-pit temperature, low stack temperature and high heat transfer, insuring maximum efficiency. Built in three types for use in warm-air furnaces and round boilers, rectangular boilers and Arcola-type heaters.

Simplicity of installation and freedom from service difficulties alone make the COLUMBIA more profitable to the Gas Company, while its many original, exclusive and fully patented features of design make it more efficient and more satisfactory to the house owner. Build YOUR gas load with the COLUMBIA!

See the
COLUMBIA Burner
at the
American Gas Convention
at Atlantic City
Booths 358-360

THE COLUMBIA BURNER COMPANY

Manufacturers of Domestic and Commercial Gas Appliances

TOLEDO, OHIO, U.S.A.

Trade News and Construction

United Engineers & Constructors Inc., Activities

The Connecticut Light & Power Company of Waterbury, Conn., have awarded contract to furnish, deliver and install automatic hydraulic operation on the 6' Carburetted Water Gas Set at the Norwalk Gas Works. A U. G. I. 6-cam Automatic Control Machine will be installed.

The Iowa Public Service Company have awarded a contract for installation at its Waterloo, Iowa, plant, for one (1) 9'0" U. G. I. Carburetted Water Gas Set with Chrisman Cycle, exhaust steam manifold, steel plate operating floor. A U. G. I. 6-cam Model "B" Automatic Control Machine will be furnished for the operation of the set.

The Indiana Consumer's Gas and By-products Company of Terre Haute, Indiana, have awarded a contract for the necessary equipment and labor to install 22.6 miles of 6" main between Terre Haute, Indiana and Paris, Illinois.

The New York Power and Light Corporation of Albany, N. Y., have awarded contract for equipment and labor to install 4" and 6" welded steel mains in and around the city of Albany, N. Y.

The Societe Financiere De Transports et D'Entreprises Industrielles, of Brussels, Belgium, have engaged the services of an expert operator and constructor, to supervise the installation and operation of the water gas plant which is now being made at La Plata, Argentine Republic.

The Detroit City Gas Company have just placed its order for 2-U. G. I. Model "B" 6-Cam Automatic Control Machines.

The Bridgeport Gas Light Company has awarded a contract for one (1) 11' 0" U. G. I. Carburetted Water Gas Set equipped with Steere Backrun, exhaust steam manifold, and U. G. I. Heavy Oil Nebulizing System and operating floor, blast main, take off main, one (1) U. G. I. Model "B" Automatic Control Machine and connections to the existing waste heat boiler. The new set will be installed adjacent to the U. G. I. set installed some years ago. In addition to the above work, plans and specifications will be prepared for the addition to the existing generator house.

The Philadelphia Suburban-Counties Gas and Electric Company of Philadelphia, Pa. have awarded a contract for one (1) 400,000 cu. ft. per hour steam engine driven gas compressor good for 100 lbs. per sq. inch together with the necessary piping and foundations.

Bryant Heater & Mfg. Co. Have Record Month

August shipments were the greatest in the twenty-five years' existence of The Bryant Heater and Manufacturing Company, according to announcement by E. P. Bailey, Jr., president.

Consumer value of the August shipment was $610,000 an increase of $156,000 or 35 percent over September of last year which was formerly the record month.

This reflects healthy business conditions and growth in popularity of gas house-heating throughout the country, in the opinion of this manufacturer.

Increase in demand for warm air furnaces has been even greater than that for boilers, the volume in furnaces during July and August exceeding expectations by over 100 percent. Continued good business is expected in September and October.

Bailey Meter Company Move to New Quarters in Boston

The Bailey Meter Company of Cleveland, Ohio, manufacturers of power plant metering equipment, automatic combustion control and feed water regulators, announces that the rapid growth of its business in the New England States has necessitated transferring its Boston Office to new and larger quarters at 523 Public Service Building, 89 Broad Street. Mr. P. T. Reuter, who has represented the Bailey Meter Company in this territory for a number of years, will continue as Branch Manager.

The Personnel of Pittsburgh Equitable Meter Company Engineering Department

The Pittsburgh Equitable Meter Company believes that progress in industry is wholly dependent on research. Improvements in design and performance must not be left to chance nor to the whim of some inquisitive mind, but must result in the definite and planned schedule of development. Close contact with the industry for which the equipment is built is an invaluable asset to the engineering department, and to this end the Pittsburgh Equitable Meter Company has made every effort to have its engineers contact with the engineers of the industry to which their equipment is sold.

The divisions of the Pittsburgh Equitable Engineering Department consist of those engineers employed primarily on test work both in the laboratory and field; others whose function is using the data and information acquired by the engineers in the laboratory; members of the department primarily engaged in making production drawings and furnishing the shop with necessary information for building the product; another group whose duties are designing the necessary tools and equipment required to insure absolute interchangeability and the best and most economical methods. The department is so organized that the constant contact of all these groups of engineers is obtained, and the improvement of existing products or the development of new products result from their close cooperation.

The sales and service forces which the company sends out in the field, have been trained in the engineering and manufacturing departments, and are thus familiar with factory problems as well as field problems, and can be of greater service to the customer.

Bartlett-Hayward Start Construction on New Gas Holder in St. Louis

Construction has been started on the new 10,000,000 cubic foot capacity gas holder for The Laclede Gas Light Company at St. Louis, by the Barlett-Hayward Company of Baltimore, Md. It is among the largest of its type ever constructed and together with the pumping station will represent an investment of more than half a million dollars. The new holder is of the water tank type, containing five lifts with a diameter of 274 feet and when completed will reach a height of 230 feet. Between 5,000 and 6,000 tons of steel will be required to build it.

The new holder is being constructed to take care of the increasing gas consumption in the northwestern part of the city as well as throughout the entire city.

Willoughby S. Leech Joins G. M. Basford Company

Willoughby S. Leech, has joined the staff of the G. M. Basford Company. Mr. Leech is well known in Pittsburgh through his former sales and advertising connections with some of the largest manufacturing companies in the district, including Westinghouse Electric & Manufacturing Company and A. M. Byers Company, and through the Advertising and Sales Counsel work in which he was engaged for about eight years.

Mr. Leech will be in charge of a branch office which the G. M. Basford Company has opened in the recently completed Koppers Building, Pittsburgh, Pennsylvania. This step was taken in the interests of the Company's expanding business among the industrials of western Pennsylvania and Ohio.

The counsel of Mr. Leech on advertising matters is available to all clients of the G. M. Basford Company although Mr. Leech is permanently located in Pittsburgh.

Naylor Pipe Co. Open Office in Houston

Naylor Pipe Company, Chicago, Illinois, manufacturers of NAYLOR LINE PIPE, announce the opening of a new sales office at 601-3 Post Dispatch Building, Houston, Texas and the appointment of Mr. E. C. Kirby as District Sales Manager in Texas and Louisiana with headquarters at the new Houston office.

Mr. Kirby, through his long activity selling to the oil industry; his knowledge of pipe and field conditions, is well-equipped to render every service on NAYLOR LINE PIPE for oil, air, water and gas.

Gas Machinery Company Contracts

The Southern Public Utilities Co., of Charlotte, N. C., have placed an order for refilling a bench of half depth sixes, at their plant in Winston-Salem, N. C.

This construction work includes standard type of built in furnace with Gas Machinery parallel flue type of recuperators with settings of silica sectional retorts and shapes.

The Louisville Gas & Electric Co., Louisville, Ky., thru the Byllesby Engineering & Management Corp'n., 231 So. LaSalle St., Chicago, Ill., have placed contract for furnishing a cooling scrubber with cooling coils, for their Beargrass Station.

The shell of the cooling scrubber is 8' 0" diameter and approximately 58' high, provided with wooden trays, a safety ladder, railing around top and connecting bridge to existing scrubbers at the plant.

The decanter is in the bottom of the scrubber shell.

The cooling coils are made up of 16 stacks of 2¼" O D x 20'0" long tubes, 36 pipes high.

Shipment of the shell and coils, with liquor manifolds, cooling water distributing troughs, and other parts, has gone forward from the Contractor's Shops, and the equipment will be ready for service before the heavy load of the Gas Company comes on.

The Combustion Engineering Company, 200 Madison Ave., New York City, have contracted for One Rectangular Steel Purifier, 96' 0" long x 30' 0" wide x 13' 0" high, divided into four compartments each 24' 0" long x 30' 0" wide, for treating the gas which will be made in the Low Temperature Carbonizing Plant now under construction at the Pomeroy Station, which is just outside of Coatesville, Pa.

Each compartment of the construction will be provided with two large self-sealing doors in the sides for cleaning, and also a self-sealing top cover to close opening 18' 0" x 24' 0".

The gas manifold is made up of 16" outside screw flanged valves and steel pipe connections fitted with Van Stone joints.

The manifold is arranged near the top of the side, permitting the valves to be operated from the top deck of the purifier.

Gantry crane for raising and transporting the top covers of the boxes is provided, together with the required trays, tray supports, hand railing and stairway.

The material for this construction is now partly on the ground, and the erection work will be started immediately.

Roper in New, Large Broadcasting Campaign

Having proved the tremendous effects of radio advertising on the sale of its products, the Geo. D. Roper Corporation, Rockford, Ill., has entered into a second year of broadcasting in connection with the Forecast School of Cookery, New York City. The new campaign, which is far larger in scope than the one conducted during the past year, consists of forty weeks of free cooking lessons conducted over eleven key broadcasting stations of the Blue Network by Mrs. Alberta M. Goudiss, Director of the Forecast School and Editor of Forecast Magazine, America's leading food publication.

Lessons are broadcast three times a week, Tuesday, Wednesday and Thursday mornings from 11 A. M. to 11:30 A. M., Eastern Standard Time. The stations include WJZ, New York, WGN, Chicago, WBZA, Boston, WJR, Detroit, WLW, Cincinnati, KDKA, Pittsburgh, KWK, St. Louis, WBZ, Springfield, WHAM, Rochester, WREN, Kansas City, and WBAL, Baltimore.

During the original thirty-week period in which the Forecast School of Cookery featured the Roper Gas Range in its broadcasting, 35,000 women mailed in requests for further information. Frequently during the campaign retail sales of Roper Gas Ranges were definitely traced to broadcasts.

The Roper Corporation, in co-operation with the William H. Rankin Company, nationally known advertising and merchandising specialists, has developed a complete localized tie-up advertising plan for use by dealers. Many dealers handling the Roper line are placing, or planning to place the plan in operation in their territories. Current reports from dealers and broadcasting stations indicate that the new campaign will far surpass the first campaign in public interest and results.

New "Incinor" Broadside

The Home Incinerator Company, Milwaukee, Wis., recently issued a broadside showing their various plans to assist in the sale of "Incinor". The first page shows reproduction of front pages of magazines of general circulation they advertise in to acquaint the public with the desirability of burning garbage and waste.

The second page explains their "Proven Incinor Sales Plans", which includes a series of newspaper mats. There are suggestions for window displays, direct by mail stuffers, outdoor signs and catalogs, also an "Incinor" salesman's portfolio furnished to every dealer using the direct mail material. It is a comprehensive sales campaign to help the distributors.

Alexander Milburn Company Offer $3000 for Best Articles on Welding and Cutting with City or By-Product Gases

Believing that notable achievements have been made in cutting and welding with illuminating, natural and similar widely distributed gases and convinced from their developments that there are great possibilities in this practically unlimited field, The Alexander Milburn Company of Baltimore, Md. are offering $3,000.00 to be paid $1.000 each year for the best authenticated articles sent them in the years 1930, 1931 and 1932, on the best authenticated results obtained by cutting or welding with such gases. They believe that vast sums can be saved by this process and the art of cutting made more universal.

The Alexander Milburn Company will aid individuals or companies seeking to make the necessary experiments with apparatus at nominal costs and will also help develop or finance any improved methods or systems which may warrant such development. Particulars will be furnished upon application.

F. W. Benson Becomes Treasurer of American Meter Company

At a meeting of the Board of Directors of American Meter Company, Mr. F. W. Benson of Philadelphia was appointed Treasurer of the Company, and elected to membership on the Board.

Mr. Benson has for many years been Assistant Treasurer, and fills the vacancy caused by the death on June 30 of the late Mr. William E. Helme, who was Treasurer and Vice President of the Company.

The Treasurer's office of American Meter Company is located at 700 Bulletin, Bldg., Philadelphia, Pa.

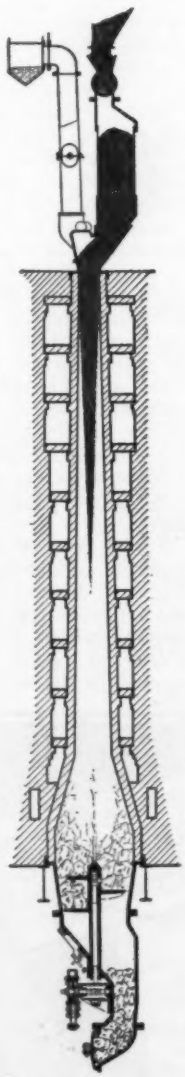
William C. Marquardt Resigns from Position with Western Gas Construction Co.

William C. Marquardt, treasurer and assistant secretary of the Western Gas Construction Company, Fort Wayne, Ind., resigned his position effective Sept. 1. He will be succeeded in his duties by R. A. Wickes of Pittsburgh, who already has arrived in Fort Wayne.

For twelve years, Mr. Marquardt has served as treasurer and assistant secre-

(*Trade News continued on page 108*)

Glover·West
VERTICAL·RETORTS



Glover-West Continuous Vertical Retort. Diagram shows method of heating; coal feed; coke extraction; gas offtake.

BOOTH 750

OVER two hundred installations of GLOVER-WEST Vertical Retorts are in continuous production service in this and foreign countries. There is only one answer: satisfactory, economical performance—flexible to every individual space, fuel, quantity and quality requirement. Investigate!

Pawtucket Gas Co.—Pawtucket, R. I.
Engineers—Stone & Webster Engineering Corporation

WEST GAS IMPROVEMENT CO., INC.

441 Lexington Ave. (Builders of Coal Gas Plants) New York

Trade News

(*Continued from page 106*)

tary of the company, going to Fort Wayne when the Koppers Company of Pittsburgh took over the Western Gas Construction Company from local interests. He had been employed as auditor for Arthur Young and Company of Chicago prior to that time.

Mr. Wickes has been in the treasury department in the main offices of the Koppers Company. He will assume the title of assistant treasurer of the Western Gas company. Mr. Marquardt said he was not ready to make an announcement as to his future connections, but stated he expected to remain in Fort Wayne.

New Aluminum Paint Booklet

The Aluminum Company of America, Pittsburgh, Pa., have issued a 46 page booklet entitled "Aluminum Paint, the Coat of Metal Protection". It tells what aluminum paint is and how to use it under various conditions. It takes up various industries and points out where this paint can be used to advantage. There is a chapter devoted to the gas plant. Considerable space is devoted to specifications and general instructions in the use of Aluminum Paint, with a list of their sales offices. A copy will be sent on request.

Semet-Solvay Engineering Corp. to Install Light Oil Equipment in Indiana Harbor, Ind.

The Youngstown Sheet and Tube Company has contracted with the Semet-Solvay Engineering Corporation, of New York, for an addition to the light oil equipment at the Company's by-product coke oven plant in Indiana Harbor, Ind.

The apparatus to be installed will be of the Semet-Solvay design for the refining of light oil and the production of motor benzol, toluol and solvent naphtha. A new building will be erected. Work is being started at once.

Philadelphia Gas Works Co. to Merchandise Electrolux Refrigerators

Servel Sales, Inc., manufacturers of Electrolux, the Gas Refrigerator, announces that The Philadelphia Gas Works Co., a subsidiary of The United Gas Improvement Co., Philadelphia, Pa., has contracted to merchandise Electrolux Refrigerators in cooperation with The Hajoca Corporation, Philadelphia district distributor for the Gas Refrigerator. Sales operations will be directed by J. B. Myers, Commercial Agent for the P. G. W. Co. Associated with him will be H. S. Christman, Asst. Commercial Agent and George Roberts, Supervisor Refrigeration Division.

Sales of "Duplex" Equipment to be Handled by Roberts-Gordon Appliance Corporation

The sales and distribution organization of the Roberts-Gordon Appliance Corporation has taken over the entire selling activity connected with the products of the Duplex Heating Co.

The Duplex line consists of straight gas-fired equipment for nearly every purpose, including units for private homes, apartment houses, hotels, office and other business buildings, garages and industrial plants.

One of the features of the Duplex line is that not only are no boilers used, but no water is employed in any of the radiators.

New Linde Oxygen Plant in Erie

A new Linde Oxygen plant located at 1628 Cascade Street, Erie, Pa., commenced operations August 21, 1929. This plant will supply the local demand for oxygen, widely used for oxy-acetylene welding and cutting.

Mr. J. J. McKeen is superintendent of this plant and Mr. R. S. Hamilton, whose headquarters are at the East Buffalo Linde plant, is District Superintendent.

"Electrolux Hall of Fame"

For the purpose of recognizing outstanding attainment among salesmen of dealer and distributor organizations, Servel Sales, Inc., has initiated an "Electrolux Hall of Fame." To it men who make unusual selling records are elected. Each month in Electrolux Refrigograms. Servel's house organ for its gas refrigeration line, salesmen are named whose records have been outstanding for the month. The latest to be given the honor are four men who have proved that the market for automatic refrigeration is as wide as the sky, and that sales are to be made in virtually every type of home.

Cyril A. Flake of A. Baldwin & Company, Electrolux distributors in New Orleans, J. W. Doris, of I. W. Danforth Co., Pittsburgh, Pa., E. L. Jolly of F. E. Gardner Company, Indianapolis, Ind., and W. A. Anderson of the Metropolitan Utilities Co., Omaha, Nebr., and the four men made members this month.

New Bulletin on Automatic Control

A new bulletin on Automatic Combustion Control designated as No. 181 is now being distributed by the Bailey Meter Company of Cleveland, Ohio.

Features of Bailey Control such as, automatic readjustment of fuel—air ratio by the Steam Flow—Air Flow relation of the Bailey Boiler Meter; the maintenance of any desired excess air at any rating; and a master pressure contactor which anticipates changes in steam pressure and sends out impulses to provide for the new conditions before they actually appear, are described by this bulletin. It also explains how flexibility in both operation and application is secured through the use of selective drum switches, intermittent drive units, high speed reset clutches, and other mechanisms which make possible the absolutely safe automatic operation of dampers and fan motors in the proper sequence.

Interlocks to prevent a serious deficiency of air at high or low ratings; travel limits to protect against overtravel of dampers, rheostats, drum controllers and valves; time limits to prevent runaway conditions; handwheels for emergency operation and other safety features are covered in the bulletin.

Pre-view of the Convention by American Gas Journal Artist

SUPERIOR DIAPHRAGMS

THE question of the relative merits of SEMI-CHROME versus BARK TANNED leather is at the present time being considered by the Distribution Committee of the A. G. A.

Diaphragm replacement is the chief item of expense in repairing meters.

Experiments in some cases show that where condensation is encountered SEMI-CHROME gives the longer service.

Why not visit Booth 653 at the coming A. G. A. Convention at Atlantic City and look into this matter?

We use Prime selected skins, expert workmanship with a new improved rolled edge ring.

Result: A SUPERIOR DIAPHRAGM

Booth 653

A. G. A. Convention Atlantic City

In attendance

John H. Walsh
Jay M. Grady
Thomas J. Martin
William P. Smith

SUPERIOR METER CO.

BUSH TERMINAL BLDG. NO. 20 BROOKLYN, N. Y.

Pacific Coast Gas Association Convention

THE Thirty-sixth Annual Convention of the Pacific Coast Gas Association was held at Del Monte, Cal., September 10th to 13th, and was productive of a number of excellent papers and committee reports.

Charles H. Dickey,
Retiring President P. C. G. A.

The registered attendance totaled 381, a record for these conventions in a location North of Los Angeles. It is interesting to note that this attendance included 189 gas company employes coming from six states, from Canada and from Hawaii, 41 gas appliance manufacturers, 68 representatives of supply houses, 9 miscellaneous, 3 whose company affiliations are unknown, and 71 ladies.

The papers on the program were of an unusually high caliber resulting in several awards for merit. Two Gold Medals were awarded in the Accounting Section, one to R. A. Hornby of the Southern California Gas Company, Chairman of the Committee on Fixed Capital, and the second to A. T. Kelly of the Pacific Gas and Electric Company, Chairman of the Committee on Preservation and Destruction of Records. One Gold Medal was awarded in the Public Relations Section, this going to Mr. Geo. L. Myers of the Portland Gas and Coke Company, Chairman of the Committee on Legislation and Taxation. This report will be published in pamphlet form by the association. A fourth Gold Medal was awarded to Mr. F. S. Wade, President of the Southern Counties Gas Company, in token of the Association's appreciation of his assistance in financing our Cooperative Advertising Campaign in his position as Chairman of the Ways and Means Committee.

The following reports and papers were awarded Honorable Mention:

Committee on Sales Department Budgeting, Commercial Section: C. R. Miller, Portland Gas and Coke Company, Chairman.

Committee on Cooperative Advertising, Commercial Section: D. L. Scott, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Natural Gas Transmission Pipe Lines, Technical Section: M. R. Thompson, Southern Counties Gas Company, Chairman.

Committee on Gas Generator Refractories, Technical Section: T. N. Kellett, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Materials and Methods, Technical Section: W. A. Bahr, Pacific Gas and Electric Company, Chairman.

Committee on Adapting Appliances to a Change in Heating Value, Technical Section, A. R. Bailey, Los Angeles Gas and Electric Corporation, Chairman.

Committee on Measurement of Large Gas Volumes, Technical Section: F. A. Hough, Southern Counties Gas Company, Chairman.

Committee on Chemical Control, Technican Section: Duncan Stewart, Pacific Gas and Electric Company, Chairman.

Committee on Oil Gas Production, Technical Section: R. R. Ripley, Portland Gas and Coke Company, Chairman. Committee on Organic Sulphur, Technical Section; K. N. Cundall, Pacific Gas and Electric Company, Chairman.

Paper: Service is the Key to Better Public Relations, W. M. Henderson, Los Angeles Gas and Electric Corporation.

Paper: Recent Developments in Oil Gas Production, L. B. Jones, Consulting Gas Engineer.

The Bastford Trophy for the best Section program for the year was awarded to the Public Relations Section whose Chairman was A. E. Holloway of the San Diego Consolidated Gas and Electric Company.

Officers elected for the year beginning October 1, 1929, were as follows:

President, F. H. Bivens, Southern Counties Gas Company, Los Angeles.

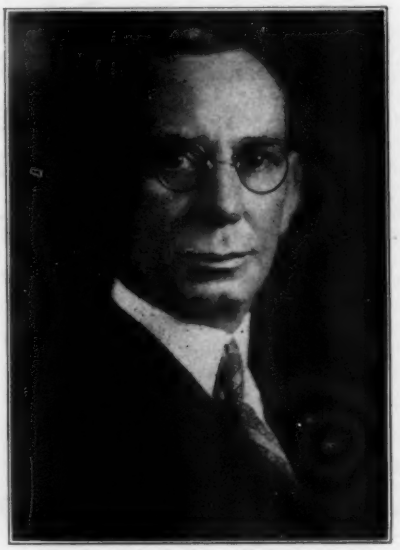
Vice-President, R. E. Fisher, Pacific Gas and Electric Company, San Francisco.

Treasurer, D. G. Martin, Pacific Gas and Electric Company, San Francisco.

Directors—Geo. A. Campbell, Sierra Pacific Power Company, Reno, Nevada; J. P. Coghlan, Pacific Gas and Electric Company, San Francisco; C. H. Dickey, Del Monte, California; John Keillor, British Columbia Electric Power & Gas Co., Vancouver; H. L. Masser, Los Angeles Gas and Electric Corporation, Los Angeles; Wm. Moeller, Jr., Southern California Gas Company, Los Angeles; M. A. Pooler, Tucson Gas, Electric Light & Power Co., Tucson; W. F. Raber, San Diego Consolidated Gas and Electric Co., San Diego; W. M. Thompson, Reliance Manufacturing Company, Alhambra, Calif.

By action of the Board of Directors the title of Clifford Johnstone was changed from Executive Secretary to Managing Director.

Mr. Bivens, the newly elected president, announced the following appointments:



F. H. Bivens,
President-elect P. C. G. A.

Chairman of Accounting Section: D. G. Martin, Pacific Gas and Electric Company, San Francisco.

Vice Chairman Accounting Section: M. W. Thernes, Spokane Gas and Fuel Company, Spokane.

Vice Chairman Accounting Section: R. A. Hornby, Southern California Gas Company, Los Angeles.

Chairman of Commercial Section: J. Earl Jones, Portland Gas and Coke Company, Portland.

Vice Chairman of Commercial Section: F. U. Naylor, Pacific Gas and Electric Company, San Francisco.

Vice Chairman of Commercial Section: Frank Weiss, Los Angeles Gas and Electric Corporation, Los Angeles.

Chairman of Public Relations Section: Geo. L. Myers, Portland Gas and Coke Company, Portland.

Vice Chairman Public Relations Section: J. F. Pollard, Pacific Gas and Electric Company, San Francisco.

Vice Chairman Public Relations Section: J. C. Gilbert, Southern Counties Gas Company, Santa Monica.

Chairman of Technical Section: Wm. Moeller, Jr., Southern California Gas Company, Los Angeles.

(Continued on page 112)

AGAIN

ROPER HARNESSES RADIO'S POWER FOR THE GAS INDUSTRY

WJZ New York
WGN Chicago
WBZA Boston
WJR Detroit
WLW Cincinnati
KDKA Pittsburgh
KWK St. Louis
WBZ Springfield
WHAM Rochester
WREN Kansas City
WBAL Baltimore

This Greater campaign features Gas, the perfect fuel, and the Roper Gas Range

●

11 Key Radio Stations Reaching 82,000,000 People

●

40 weeks of broadcasting conducted by famous Forecast Radio School of Cookery, New York City

●

Tremendous sales influence that doesn't cost you a cent

●

Get facts. Tie in. Enjoy maximum results. Write or wire

GEO. D. ROPER CORPORATION
ROCKFORD, ILLINOIS

ROPER

TRADE MARK. REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES

Gas Furnaces—Hotel and Restaurant Equipment—Radiantfire Sheetflame Space Heaters

Pacific Coast Gas Association Convention

(Continued from page 110)

Vice Chairman Technical Section: R. E. Kelley, Pacific Gas and Electric Company, San Francisco.

Vice Chairman Technical Section: J. R. Ripley, Portland Gas and Coke Company, Portland.

Gas Plays an Important Part at the National Metal Exposition

THE Industrial Gas Exhibit sponsored by the American Gas Association was the center of unusual interest and enthusiasm for those attending the National Metal Exposition at Cleveland.

The total space occupied by the American Gas Association exhibit was approximately 7200 sq. ft. Of this the American Gas association used a central location of 400 sq. ft., in which to display a model of the world's largest gas holder which revolved and displayed in its sides translucent photographs of actual industrial gas installations in the metal working industries. This space was also set aside as a lounge from which were distributed technical publications of the American Gas Associations of interest to metal men. The rear wall of this central display was covered by a number of large size oil paintings depicting the use of gas for various metal melting and treating operations.

One of the features of the week was the importance of temperature and atmospheric control in forging furnaces which was brought out in a paper by W. E. Jominy, as a result of some of his work at the University of Michigan on the American Gas Association's research on forging. The data presented gave the limiting temperatures to which some of the more common forging steels may be heated without danger of harming the steel by overheating or burning. These temperatures are given below:

Hardness S. A. E.	Maximum temperature to which steel may be heated without danger of overheating or burning:
1015	2650° F.
1030	2600
1050	2525
1090	2375
3145	2450

(These temperatures are safe only if the furnace atmosphere contains no turbulent oxygen.)

Mr. Jominy indicated in his paper that a common method of heating steel for forging, to-day, is to place the bars or billets directly in the flame of the forging furnace. Under these conditions it is possible to have shafts of air impinging on the bars or billets being heated due to stratification of the furnace atmosphere. When this happens burning may occur at small sections along the bar and may pass through unnoticed. If one of the small burned areas happens to come at a point of high stress in the finished part, failure is apt to result. It is therefore important in the design of forging furnaces to control both the atmosphere and the temperature.

Mr. Jominy's paper was well received and substantiated by other men carrying on research work of a similar nature.

The exhibitors operating with the American Gas Association were the American Gas Furnace Company, East Ohio Gas Company, Gehnrich Oven Company, Eclipse Fuel Engineering Company, C. M. Kemp Mfg. Company, The Partlow Corporation, The Selas Company and the Surface Combustion Company. Their exhibits were very complete covering the latest type of gas-fired equipment.

The East Ohio Gas Company not only mailed invitations to all of their customers, but in addition provided transportation and guides for them so that they could see the latest developments in industrial gas furnaces. These contacts were very worth while as apparently every customer engaged in the metal melting and treating industry was in attendance during the exhibition.

The American Gas Furnace Company displayed a very complete line of automatic heat treating machines. These covered the various rotary carbonizing and vertical carbonizing furnaces, reciprocating hearth heat treating furnaces, conveyor type heat treating furnaces and the new rotary brass melting. Each of these furnaces were equipped with automatic temperature control and the new type flow meter which indicates the gas consumption at any particular moment. In addition to the automatic furnaces the American Gas Furnace Company also displayed several of their smaller heat treating furnaces and stationary type large oven furnace.

The Eclipse Fuel Engineering Company displayed a line of small furnaces for tool room hardening as well as large production heat treating furnaces. An interesting deviation from the heat treating field was the new type of blast, high pressure steam boiler shown by the Rockford Company. It also exhibited many new automatic temperature controlling devices and various type of gas burners. Five distinct types of proportional gas and air mixers and a number of high pressure gas-fired steam boilers completed the exhibit.

The Gehnrich Oven Company had on exhibition an automatic conveyor oven and an indirect gas-fired air heater. The conveyor oven is 17 feet long, 6 feet wide and 10 feet high, being of the latest design. It is indirect gas heated and automatically takes care of the enamel or japan dipping, dripping, baking and cooling operations, being so constructed that only one operator is required to load and unload the oven. It is ventilated by a counter-flow system whereby the heat from the outgoing material preheats the incoming air insuring a lower gas consumption per finished piece than it is possible to obtain with any other system.

The air heater is a sectional type unit making it possible to add additional sections as they are required by increased production. Occupying a floor space of but 2 x 6 feet, a single section air heater will deliver 20,000 feet of air per hour at a rise of 250° F., over that of the average room temperature (70°).

Like the conveyor oven, the air heater is an indirect fired unit whereby the products of combustion cannot come into contact with the material being heated. Only fresh heated air is delivered by the heater making it ideal for the most exacting requirements. This equipment is used for drying of chemicals, powders, etc., and all processes requiring large volumes of heated, clean, uncontaminated air.

At the C. M. Kemp Mfg. Company's booth, considerable interest was shown in the Nash motor being operated on natural gas completely mixed with all the air necessary for its combustion. This operation is identical with operation at the Nash Racine and Milwaukee factories where all motors are subjected to the test run prior to their shipment.

Another item of interest was the display of a circulating immersion element applied to the melting of lead. This unit, which is immersed inside of the lead kettle, eliminating the combustion outside of the pot, eliminates furnace settings and their maintenance, and due to high velocity of products of combustion and the large amount of heating surface, is very efficient.

The Committee is charge of the American Gas Association booth consisted of: Messrs. Karl Emmerling, H. F. Rehfeldt, E. B. Dunkak, C. W. Berghorn and A. M. Apmann, Chairman.

The work of piping and setting of appliances was under the direct supervision of Mr. J. C. Shanks of the East Ohio Gas Company, whose arrangements were complete in the last detail, and through whose careful efforts all the details were carried through without any hitch.

GAS MEASUREMENT ENGINEERING

AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & McILHENNY
MARYLAND METER WORKS

Published Periodically by
AMERICAN METER COMPANY
INCORPORATED
Established 1836

D. McDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

VOLUME 1 | *October, 1929* | NUMBER 2

KNOWN FACTORS CUBIC FEET IN METER VALUE

FEW people realize that the Graf Zeppelin on her recent spectacular flight around the world used gas, not gasoline, as fuel for her engines. We present in this number of *Gas Measurement Engineering* photographs and a description of the equipment used in measuring the gas which the giant airship took aboard at Los Angeles on August 26, 1929. The above photo shows the scene at the mooring mast during the refueling operation.

Write for complete copy of Gas Measurement Engineering giving full story.

Booths Nos.	*680*	*678*	AMERICAN METER CO MEASUREMENT ENGINEERS CUBIC FEET	*676*	*674*	*672*	*670*	*668*
A. G. A. Convention	*781*	*779*		*777*	*775*	*773*	*771*	*769*

A Complete Index to American Meter Company Literature on the Various Requirements of Gas Measurement Engineering

Subject	Description	Catalogue or Bulletin
General	A complete General Catalogue (1929) of tinned steel case and of iron case gas meters for domestic and industrial requirements; meters for large volume measurement, test meters and other apparatus for laboratory and experimental purposes. Also connections, meter repair parts and diaphragms.	G-1
Measurement by Positive Displacement	**Domestic and Industrial**—A reference handbook *now in course of preparation* will contain a complete description of the fundamental physical laws applying to displacement measurement at vacuum, low and high pressure; latest approved methods of testing meters, meter adjustments and meter capacities; complete tables for testing and all tables applying to changes in density.	E-4 When ready
	Special—A separate catalogue describing Wet and Dry Test Meters, Demonstration, and Exhibition Meters.	*AG-3
	Special—A separate catalogue describing Recording and Indicating Demand Meters.	*AG-4
Volume and Pressure Recording	A bulletin on the Westcott Volume and Pressure Recording Gauge containing a general description of the measurement of gases at pressures other than atmospheric, with complete tables for changes of density.	E-6
Meter Testing Apparatus	A separate catalogue describing Meter Provers, Cubic Foot Bottles, Hydro-Pneumatic Meter Testers and gassing machines.	*AG-1
	An Instruction Bulletin for operating meter provers.	A-1
	An Instruction Bulletin for testing high pressure meters by means of the Critical Flow Prover.	E-20
Measurement by Orifice	**Westcott Orifice**—A separate catalogue describing Westcott Orifice Meters for Gas in Large Volumes and for Air, Steam, Oil and Water.	*EG-2
	A reference book containing a complete description of the orifice meter for the measurement of gas, air, steam, oil and water, with detailed instructions for installation and numerous examples illustrating calculations of coefficients and sizes of orifices. (104 pages.)	E-2
	Linderman Orifice—A new booklet now being prepared on operating the Linderman Meter for large volume measurement (guaranteed accurate within one per cent. from zero to the full capacity of the meter). Pending the completion of this booklet, information is available from the general catalogue or on request.	L-1 When ready
Orifice Meter Applications	**Metric Indicating Flow Meters**—This bulletin contains a complete description of meters used for indicating the flow of gas, air, oil, caustic solutions and water through lines; detailed description of methods for calculating coefficients, capacity, rate factors and numerous views of lay-outs most suitable for different types of measurement.	E-3
	Metric Rate-volume Controller—This bulletin describes the method of installation of metric rate-volume controllers for automatically controlling the rate of flow of gas, air, oil, steam, water, and other liquids.	E-5
Gas Testing Apparatus	A separate catalogue describing the American Calorimeter, Sulphur and Ammonia Tests, Laboratory Pressure Governors, Specific Gravity Apparatus, etc.	*AG-2
	An instruction booklet of 42 pages for use in the operation of the American Calorimeter.	A-2
	[illegible] for operating the [illegible] ion types of [illegible]ic gravity [illegible]ratus	E-8

Write for a Complete Chart

AMERICAN METER COMPANY

INCORPORATED

ESTABLISHED 1836

The World's Largest Manufacturers of Gas Meters and Allied Apparatus

General Offices: 105 West 40th Street, New York City.

Tomorrow's Range Sales Will Be Dominated by *Appearance!*

More and more the appearance of a gas range affects its salability. Those manufacturers and retailers who are "abreast of the times" will pay particular attention to the "eye-appeal" of their product.

WILCOLATOR Oven-Control Equipment will play an important part in tomorrow's sales. Acknowledged to be the best-looking heat-control on the market, its appearance and utility have been improved in the CONCEALED-ROD-AND-TUBE Model.

Please send your folder No. 87, describing the new CONCEALED-ROD-AND-TUBE WILCOLATOR.

Firm .....

Address .....

Attn. of .....

Amer. Gas Jour. 10/29

See it at Booths 362-4, at the A. G. A. Convention—or send for folder No. 87

THE WILCOLATOR COMPANY

17 Nevada Street **Newark, N. J.**

The Finest Ranges are Wilcolator Equipped

The Most Important *Announcement*

Ever Made in the Gas Industry!

The DUPLEX LINE of STRAIGHT GAS FIRED EQUIPMENT is added to the ROBERTS CONTROLLED GAS HEATING CONVERSION UNIT LINE.

THE DUPLEX LINE is for new installations in homes, hotels, office buildings, public garages and greenhouses. No water is used in the DUPLEX LINE. "HEAT WHERE YOU WANT IT, AND WHEN YOU WANT IT."

CONVENIENCE, COMFORT, PLUS ECONOMY

THE DUPLEX LINE will be shown at the Roberts-Gordon Booths at the Atlantic City Convention. See it and you will immediately think of a hundred new buildings that need it and will buy it from you.

Catalogs and data are ready for you.

ROBERTS-GORDON APPLIANCE CORP.

DELAWARE AVE. at TUPPER STREET,

CURTISS BUILDING BUFFALO, N. Y.

Booths 231 and 130

A.G.A. Convention

OCTOBER 14th to 18th, 1929

ATLANTIC CITY

Will be headquarters for House Heating with GAS

There's a ROBERTS UNIT for every size and type of Heating Plant

EVERY MAN IN THE GAS INDUSTRY IS INVITED TO VISIT THIS EXHIBITION OF ROBERTS CONTROLLED GAS HEATING UNITS

You are invited to not only look over the Roberts Units, we want you to ask for information about house heating. We will gladly go into all details, costs of heating the average home, how you can sell more gas in your communities, number of salesmen you will require to start an aggressive house heating campaign, etc.

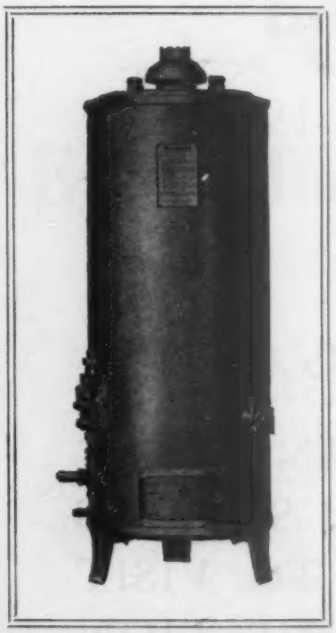
ROBERTS-GORDON APPLIANCE CORP.

DELAWARE AVE. at TUPPER STREET,

CURTISS BUILDING **Buffalo, N. Y.**

These Two Leaders are Supreme

in the large gas water heater sales of today

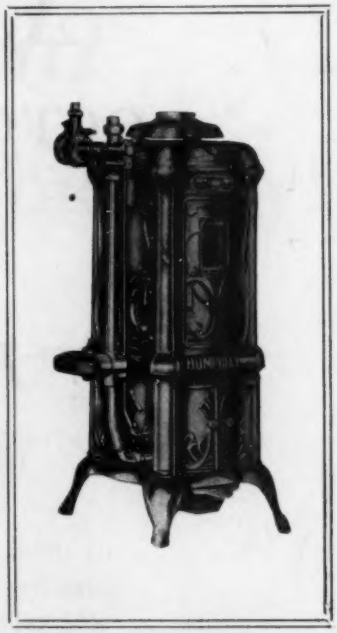


THE NO. 20 KALAMAZOO

ONLY

$95.00

EACH



THE NO. 25A HUMPHREY

amazes all with its grand service at remarkably small fuel expense.
Has a very heavy boiler of corrosion resisting copper bearing metal, hot galvanized. A non-settling insulation of treated mineral wool encased in thick corrosion resisting metal. Also these—

EXCLUSIVE PATENTED FEATURES—

Simple, Sturdy Humphrey Snap Thermostat operating on fewest degrees change.
Simple Humphrey Safety Pilot Cut-Off Combination Drain Cock and Relief Valve.
and finally—

THE HUMPHREY FUEL ECONOMIZER

Dependable service and amazingly low fuel costs are aided by a standby loss only half of what is permissible.

is equally outstanding in its better differences.
Full 2½ gallons per minute.
Double durable cast iron shell.
Elevated valve
Two-piece piston
True-travel piston
Heat-zone Thermostat
Two gas valves
Triple control
Economy flash pilot
Semi-bunsen pilot
Concealed packing adjustments
Removable drip pan
Non-collapsible draft hood
Copper Coil of 18 gauge

LASTS LONG
and
ALWAYS PLEASES

The volume market is reached with these two great leaders. Buyers are pleased because "they get their money's worth" in all the Four Points of Real Investment Value.

Larger sizes and other types permit exactly fitting any need without makeshift of doubtful satisfaction.

New Fall and Winter Advertising is ready to increase your sales.

HUMPHREY COMPANY, Kalamazoo, Michigan

TIME-O-STAT Distributors now number 25—located in principal cities of the United States and Canada—serving Time-O-Stat Dealers and customers efficiently and well.

Hardly a single Dealer is more than 12 hours distant from his nearest Distributor. Most of them are even nearer. As a result, Time-O-Stat Dealers are able to offer a service unique in the field for its efficiency, promptness and thoroughness.

Users of automatic controls appreciate real service, quickly and cheerfully given! That's why practically any control in the entire Time-O-Stat line can be successfully ordered for immediate delivery. Installation can be had when needed. There are no days and weeks of waiting for parts from the factory, for each Distributor carries an ample stock of Time-O-Stat products.

What's more, every Distributor has a trained organization ready to give cheerful service and cooperation to Time-O-Stat Dealers and their customers. Dealers and users of automatic controls will find it a pleasure to work with the Time-O-Stat Distributor . . . and by the way, have you noticed the completeness of our line of controls (listed below) . . . just write for catalog of the products which interest you!

TIME-O-STAT CONTROLS COMPANY
ELKHART INDIANA

Successor to
ABSOLUTE CON-TAC-TOR CORP.
TIME-O-STAT CORP.
LEACHWOOD COMPANY
CRAMBLET ENGINEERING CORP.

EXCLUSIVE TIME-O-STAT SERVICE

Factory Sales and Service Offices

① Boston, Mass.
② Chicago, Ill.
③ Detroit, Mich.
④ Elkhart, Ind.
⑤ Kansas City, Mo.
⑥ New York, N. Y.

Exclusive Distributors

1 Baltimore, Md.
2 Birmingham, Ala.
3 Buffalo, N. Y.
Chicago, Ill.
4 Cincinnati, O.
5 Cleveland, O.
6 Columbus, O.
7 Dallas, Texas
8 Denver, Colo.
9 Los Angeles, Cal.
10 Milwaukee, Wis.
11 Minneapolis, Minn.
12 Newark, N. J.
New York, N. Y.
13 Oklahoma City
14 Omaha, Neb.
15 Philadelphia, Pa.
16 Pittsburgh, Pa.
17 St. Louis, Mo.
18 Salt Lake City, Ut
19 SanFrancisco, Cal
20 Seattle, Wash.
21 Washington, D. C

In Canada

22 Montreal, Province of Quebec
23 Toronto, Province of Ontario

Export Office

New York City
New York

Manufacturers of AUTOMATIC CONTROLS for Oil Burners · Gas Burners · Coal Burners · Electric Refrigerators · Furnace Fans · Mechanical Stokers · Industrial Ovens · Ice Machines · Unit Heaters · also of Sign Flashers · Mercury Switches · Electric Heaters · Corrugated Metal Bellows

AN OUTSTANDING CONTRIBUTION to GAS HEATING

• FOURTH •

POSITIVE MECHANICAL CONTROLS

ABSOLUTELY POSITIVE IN ACTION...NO DIAPHRAGMS OR MAGNETIC CONTROLS... ENTIRELY MECHANICAL

IDEAL GAS BOILERS

MADE BY

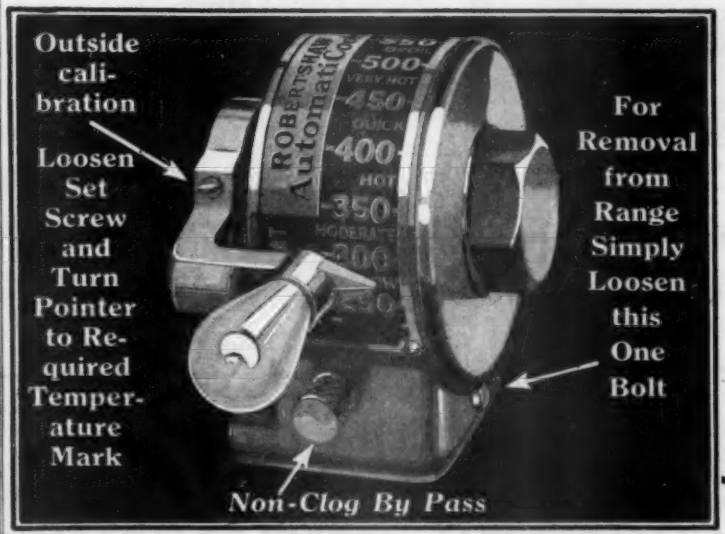
AMERICAN RADIATOR COMPANY

SOLD BY

AMERICAN GAS PRODUCTS CORPORATION

376 LAFAYETTE STREET . . NEW YORK

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

Mrs. Smith of Porter, Indiana, in her attractive Chambers equipped kitchen

This illustration is from a series of Chambers advertisements running in National women's publications.

Why Mrs. Florence Busse Smith *Selected a Chambers Range*

Exhibiting at

A. G. A. Convention

Atlantic City

Booths 217-219-221

Because it is the ultimate in cooking appliances

Awarded the Grand Prize, Paris, 1928. Approved by leading cooking institutes and by American Gas Association.

Grand Prize Paris, 1928

You would be selling more gas ranges at a better profit than you normally enjoy, if you handled the Chambers Autostat Gas Range. This is a provable fact.

Simply because this range out-performs any and every other range.

When rightly presented, the retail prospect cannot withstand the appeal of this notably fine cooking appliance.

Here is an instance:

A housewife in South Bend bought a thoroughly modern conventional gas range that satisfied her in every respect until she saw the Chambers.

She sacrificed $60 on a range that was only 60 days old; spent $125 more to remodel a kitchen alcove, and paid a far higher price for the Chambers Range itself because she became so overwhelmingly enthusiastic for Chambers advantages. And she was not a wealthy woman.

That indicates what a strong selling proposition we have for dealers in territory not now covered. Write us, if you want details on the Chambers franchise.

The Chambers Manufacturing Co.

45 Columbus Park ***Shelbyville, Indiana***

Originators of the insulated gas range, the Thermodome and the Autostat

*

Chambers AUTOSTAT *Gas Range*

The Chambers Thermodome provides top stove cooking on stored heat. A heavily insulated drum envelopes the stewing kettles so that the gas is burned but half the normal period. The results are excellent. Because less water is required, food salts and food flavors are conserved.

In oven baking also, the retained heat principle is followed. Heat from the burners is imprisoned within completely insulated walls. Then there is the Chambers Autostat which removes all the guess from baking, besides freeing the housewife from the kitchen. This exclusive device is set to shut off the gas completely at exactly the right time.

?

How About The Fine Homes In Your Territory

IN every community there are many fine homes, having all brass water piping and everything else of highest quality. Such a home should have a Copper water heater, and the gas company who allows a galvanized iron system to be installed, falls short of the duty and responsibility which it owes to its customers.

THE purchaser does not know, but every gas man realizes that for the better home, the Copper Kompak is the best water heater that money can buy

THE KOMPAK CO.

Automatic Thermostatic Gas Water Heaters

NEW BRUNSWICK NEW JERSEY

KOMPAK

TRADE MARK REG.

Visit us in BOOTHS 445-447

NEW
Smoothtop
REG. U.S. PAT. OFF.

new **design**
new **models**
new **features**
new **insulated oven**

NEW
ORIOLE
REG. U.S. PAT. OFF.

new **automatic time and temperature control**
new **burner lighter**
new **concealed manifold**

COME! See These Inter

BOOTHS Nos.

STANDARD GAS

Sales Offices—
NEW YORK—BALTIMORE—CHICAGO—PORTLAND (OREGON)—LOS ANGELES, CAL.

NEW

Acorn

new

cabinet line

new

concealed manifold

new

refrigerator range

NEW

VULCAN

new

high speed broiler

new

deep fat fryer

new

griddles

esting New Appliances

451-457-350-356

EQUIPMENT CORP'N.

***Factories*—JERSEY CITY—BALTIMORE—BIRMINGHAM—AURORA**

There's Profit in Safety!

Made according to the requirements of the American Gas Association.

Approved by Casualty Council Board of Fire Underwriters Laboratories.

Good And Safe Key J & G

MANUFACTURED BY

J. & G. BRASS CO.
SOUTH RIVER, N. J.

Don't Fail to see them
BOOTH 118

Get Your Share with the New J. & G. Safety Gas Key

The New J & G Safety Gas Key is a distinctly different and an absolutely safe gas control, also a beautifier of the modern gas range.

The handle on the New J & G Safety Gas Key cannot possibly turn from its safety position unless at least eight pounds of pressure is exerted downward—easy enough for an adult to move, but difficult for a child; or through accidental catching of clothing or cleaning rags to move.

Herein lies a strong selling point to the housewife who is fearful of danger from the accidental flow of gas.

The beautiful out-of-the-ordinary Bakelite handle, in harmonious colors, indestructible and attractive, keeps pace with the improvements shown in the latest color schemes of modern gas ranges and is an extra inducement that appeals immediately to the feminine eye.

Whether you sell the New J & G Safety Gas Key in sets to install, or have them already as part of the equipment on your gas ranges in the showroom, you will profit by increased sales, as well as build up a wealth of customer good-will.

No trouble to clean,—no screws to collect dirt or grease,—no pins to wear away, become loose, or break. Nothing to get out of order or cause trouble.

Every gas company or range manufacturer can Profit from the Safety the New J & G Safety Key affords, if they will feature this beautiful protective device on *all* their gas ranges.

Send for a sample Key, examine it thoroughly and be convinced as to its selling qualities through both Safety and Beauty

Kernit

REG. U.S. PAT. OFF.

GAS-FIRED INCINERATOR

Your Customers Are Now Ready for Gas-fired Incineration

Gradually, but surely, your customers are becoming gas conscious. Waiting until new appliances gain accepted usage among large consumers, housewives are adopting these appliances one after another. Now, they are ready for the Kernit Gas-fired Incinerator.

Already gas-fired incineration is an accepted practice in hotels, restaurants, hospitals, etc. And the Kernit is suited for household incineration for the following reasons:

Operation absolutely safe, even if incinerator is overloaded.

Burners fully protected against moisture and other matter.

All internal parts accessible and in plain sight.

Built for a lifetime of usage.

Equipped with time clock shut off valve which turns the gas off automatically.

No matches required — burner is lighted from push button pilot light.

Easily and quickly installed and connected to gas line and chimney.

Made in 3 and 4 bushel sizes.

To aid you in selling the Kernit to the housewives in your territory, we have a complete sales plan. A manual gives you detailed directions, including ways for fixing district quotas, payments for salesmen, etc. Window displays, newspaper advertisements, circulars and direct mail letters also are provided.

This sales plan already has been used with success by several large gas companies. Ask us about it and also inspect the Kernit exhibit during the A.G.A. Convention.

COMPANY MEMBER OF AMERICAN GAS ASSOCIATION

BOOTH 431

Kernit Incinerator Company,

AMPERE, NEW JERSEY

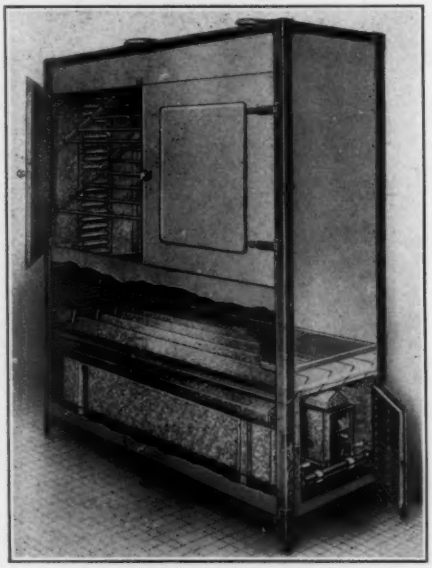
JUDELSON CLOTHES DRYERS

Drawer and Cabinet Styles

Now Available in Standard Sizes

IN ORDER to meet the rapidly increasing demand for Judelson Dryers in standard sizes, we have built a new factory in Moundsville, W. Va.—and are now able to quote you attractive prices and make prompt shipment in any quantity.

Judelson Dryers may now be had in two styles and several sizes—equipped with the highly efficient Judelson System of heating, ventilation, evaporation and fresh air circulation; insulated bodies; automatic heat control; and baffles that protect user from blast of heat when dryer doors are opened for loading or unloading racks.



No. 602 Cabinet Style

No. 903 Drawer Style

Judelson Dryers have stood the test of more than a quarter century. This long period of excellent service, combined with many exclusive, patented features, have developed a powerful preference for them. Thousands of America's finest homes, apartment-houses, and institutions are equipped with them—specified by leading architects.

A Careful Examination of the Judelson Dryer and its Special Features will Convince You of its Superiority.

SEE THEM IN BOOTH 227

JUDELSON DRYER CORPORATION

Makers of Efficient Drying Equipment Since 1892

MOUNDSVILLE, W. VA.

Extra strength

where strain is greatest!!

On gas installation jobs where maximum dependability is essential, it's just common sense to provide additional strength where strain is greatest. That's why you will find Mueller G-11094 gas stops (round way and straight-way) used on so many A1 installations. *These* Mueller iron body stops have "recess ends" that extend nearly three-quarters of an inch beyond the threads. Threads are thus protected and *extra* strength is provided where it counts most!

You'll find all characteristic Mueller features in these stops—iron body and red brass key—inlet and outlet threaded at same time, permitting straight line connections—"hot process" galvanizing for underground protection. Made in sizes ¾" to 2" inclusive.

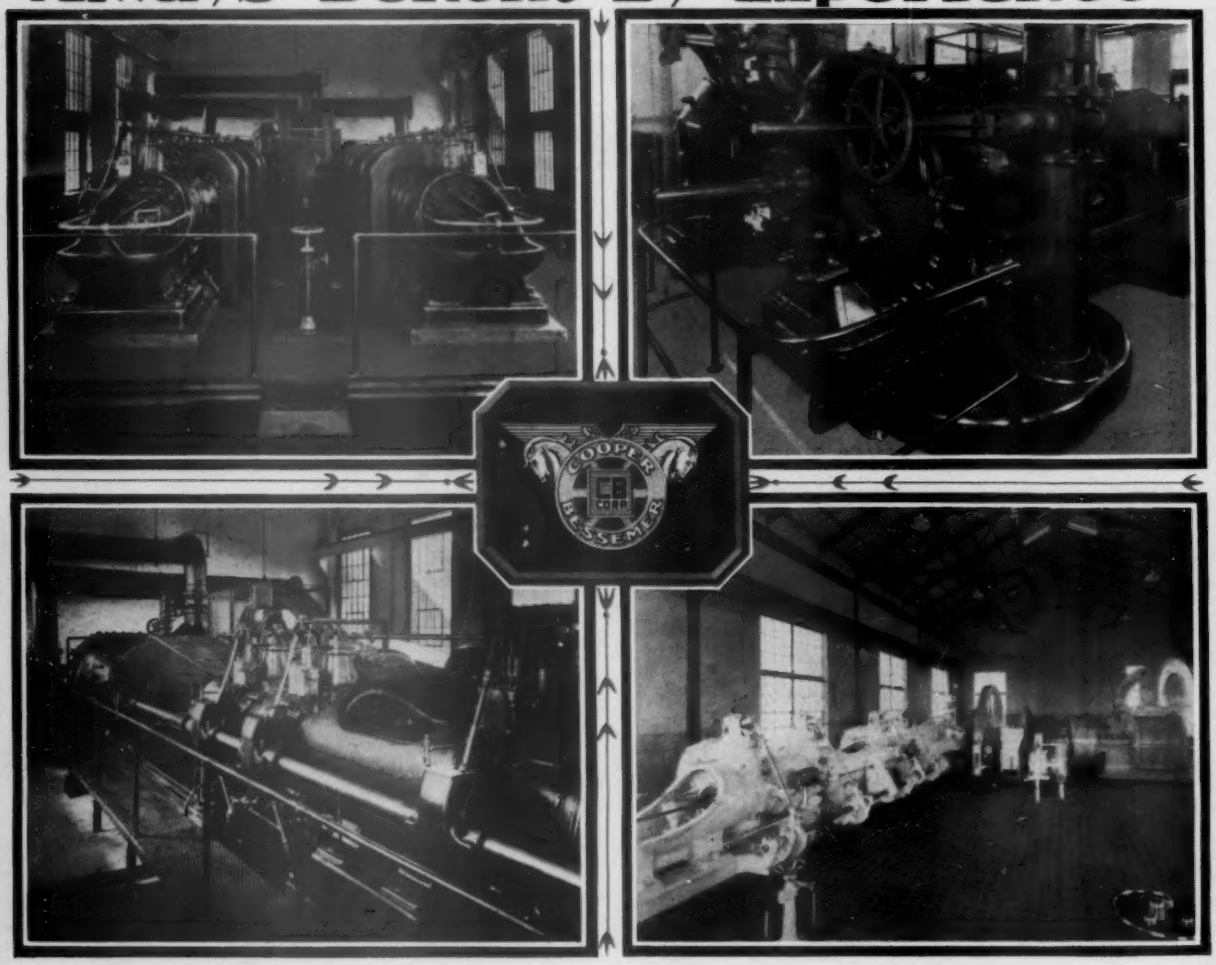
MUELLER CO. (Established 1857), Decatur, Illinois; *Branches:* New York, Dallas, San Francisco, Los Angeles; *Canadian Factory:* MUELLER, Limited, Sarnia.

MUELLER
G-11094 Recess
End Gas Stop

Mueller gas stops are made in sizes and styles to suit every requirement. Your request will bring complete information or we will gladly make recommendations for specific installation problems.

MUELLER

A GOOD PURCHASING RULE
"Always Benefit By Experience"



MANY of the leading natural gas companies have standardized on Cooper-Bessemer compressor units because of their dependability, low-cost operation and practically care-free service.

Men choosing equipment for manufactured gas distribution are being influenced by these same qualities. The present buying trend indicates that Cooper-Bessemer compressors will gain the the same leadership in manufactured as they now hold in natural gas transportation.

These engine compressor units have many advantages. They are not subject to forced interuptions by electrical storms, or accidents to the electric transmisson line. They are equally practical for continuous transmission on high pressure peak loads.

One of our representatives will gladly give you complete information. Let us know when you are ready.

The Cooper-Bessemer Corporation

Formerly The C. & G. Cooper Co. and The Bessemer Gas Engine Co.

Mount Vernon, Ohio Grove City, Pennsylvania

Branch offices in all principal cities

YOU'RE ALWAYS SAFE IN CHOOSING A COOPER

COMPACT - POWERFUL - MOBILE

THE BABY DIGGER

The Old Way
Slow and Expensive

The Modern Way
Faster, Easier, Cheaper

MAKES FORMER DIGGING METHODS OBSOLETE!

Gas companies now using one or more Cleveland Baby Diggers know that with the installation of these machines they have placed their trench digging on the basis of maximum efficiency.

These utility companies realize that machine digging with its speed and economy is the most profitable and satisfactory method of trenching, and that their Baby Diggers have made it available on over 95% of their jobs.

Many trenching jobs which were formerly considered too small to warrant the expense of transporting a machine are now handled easily by the Baby Digger, which in five minutes can be loaded on its own special trailer, for truck-speed travel to the next job, whether five or fifty miles away. This extreme mobility greatly decreases the unproductive time of machines and men.

Then too, many jobs, in built up portions of towns, where hand-labor was formerly the only possible method of digging, are now being dug by the Baby Digger.

Only 58" wide overall and weighing but four tons the Baby Digger slips easily past poles, trees, and other obstructions, traveling quickly over tree lawns, drives and sidewalks, without damage, and feels its way accurately past underground pipe, etc.

Modern in construction and design, usable to the highest degree, the Baby Digger has enabled many gas companies to discard forever the old, slow, expensive methods of trenching and put into effect the up-to-date labor and time saving method of machine-digging on practically all of their trench work. Certainly worth investigating. Write today for full information.

THE CLEVELAND TRENCHER COMPANY

"Pioneers of the Small Trencher"

20100 St. Clair Ave. **Cleveland, Ohio**

HAYES & WALSH
SUPERIOR BRAND LEATHER
BROOKLYN, N.Y.

Who Wants Weak Lungs?

This question is easily answered. Still Mr. Meter Man this is exactly what you condemn your meters to when you purchase leather indiscriminately without KNOWING that it is suitable for diaphragms, which are the lungs of the meter.

We Specialize in Meter Leathers

SEMI-CHROME, FAT-LIQUORED OR DRY SKINS all specially selected and tested under the personal supervision of a man who has had 30 years' experience in this field.

All our skins are marked with our "SUPERIOR BRAND" which is a guarantee of quality. Therefore buy the best and eliminate your diaphragm troubles.

U. T. HAYES & JOHN H. WALSH CO., Inc.

452-460 Keap Street, Brooklyn, N. Y.

Samples of our leathers can be seen at Booth No. 653, A. G. A. Convention

BAROMETERS

PHILADELPHIA, THE WORKSHOP OF THE WORLD
has 14,000 Manufacturing Establishments of which
many have World-Wide Reputations.

"PRINCO" STANDARD FORTIN
MERCURIAL BAROMETERS

are in World-Wide use because they,
too, have a "World-Wide Reputation"

THEY ARE GOOD BAROMETERS
THEY ARE REASONABLE IN PRICE!

For more than a decade they have been made in such manner that they can be shipped safely and successfully wherever there is a common carrier. This has been recognized as an achievement in Barometry.

PRECISION THERMOMETER & INSTRUMENT COMPANY
1439 BRANDYWINE STREET - - - - - PHILADELPHIA, PA.

U. G. I.

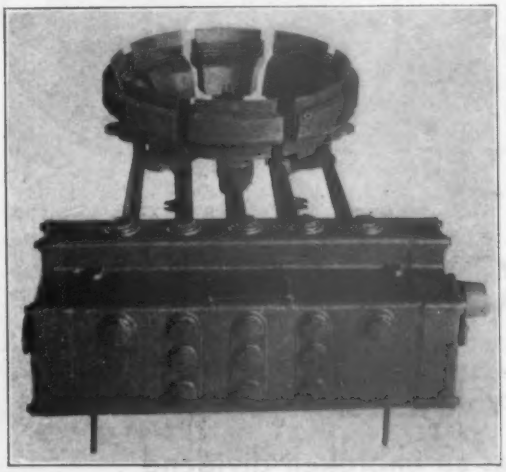
....oldest public utility Holding Company in the United States....has an unbroken dividend record of forty-four years.

THE UNITED GAS IMPROVEMENT COMPANY

Organized 1882

EXECUTIVES--MERCHANDISE MANAGERS--ENGINEERS

Why Overlook Another Source of Profit?



When so many of your prospects already own a coal fired heating plant that is in good condition, is it best to insist on their buying an entirely new boiler or furnace?

Install S&D Gas Burners Instead

And secure equal efficiency — On new construction submit alternate bids on coal boilers equipped with this most economical gas conversion.

Displayed in Booths 131, 133 and 135, American Gas Association Exhibition, Atlantic City, October 14-18, 1929.

SWEET & DOYLE FOUNDRY & MACHINE CO.

Troy, New York

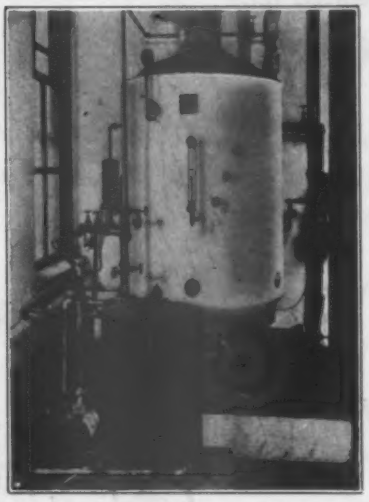
131 State St. Boston | 2013 Sansom St. Philadelphia | 50 Church St. New York City

LATTNER

Gas-Fired High Pressure Automatic Steam

BOILERS

for

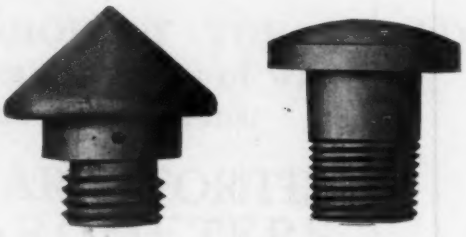


Clothing Manufacturers—for garment presses and steam irons;
Laundries—for laundry equipment and pressing machines,
Restaurants and Hotels—for steam tables, coffee urns, etc.,
Hospitals—for sterilizing equipment; for kitchen and laundry equipment;
Candy Manufacturers— for steam kettles;
Bakeries—for humidifying air in ovens and for steam proof boxes;
Bottling Plants & Dairies—for cleaning and sterilizing;
Printing Establishments— for heating matrix tables.

P. M. LATTNER MFG. COMPANY

Cedar Rapids, Iowa

GAS OUTLETS



Uniformity of the gas flame is maintained when Lava is the material employed for gas outlets.

Lava parts that we have manufactured have been varied as to size and design to meet the demands of the gas industry.

We invite correspondence.

American Lava Corporation

29-59 William Street, Chattanooga, Tennessee

Manufacturers of Lava Tips and Heat-Resistant Insulators

RE-CHROME METER LEATHER

COLONIAL BRAND

8 LOGICAL REASONS

showing advantages of "COLONIAL—Re-Chrome" over bark-tanned leather

BESSE, OSBORN & ODELL INC. · COLONIAL BRAND · BOSTON, U.S.A. · RE-CHROME METER LEATHER

1 Longer years service, hence less repairs.

2 More accurate measurement of gas. Eliminating slow and fast meters.

3 More impervious to water. Will stand a five minute boiling test.

4 Greater resistance to heat and climatic changes.

5 Stronger fibre, makes it more durable.

6 Absorbs more oil, less likely to dry out and harden.

7 More flexible, easier to fabricate, sew and crimp.

8 Eliminates "floppy" diaphragms.

This trade-mark, stamped on each New Zealand Lamb skin, is our guarantee to you that each skin has received the greatest care in its selection and tanning.

In use by some of the Largest Gas Companies in the country

We will be pleased to submit sample

BESSE, OSBORN & ODELL, INC.

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W. A. Smith—G. Norman Bankart, Representatives.

Tanneries: Clinton, Me. *and* Peabody, Mass.

COOLING GAS AFTER COMPRESSION

Reduces drip pumpage. Eliminates leakage from pipe expansion and contraction by stabilizing the temperature of the pipe. We build coolers to reduce gas temperatures to as close as within 5 degrees of the cold water temperature and with small cooling water requirements.

ANDALE COMPANY
1600 ARCH STREET
PHILADELPHIA

IRON OXIDE BORING

For Purifying Gas at Least Cost

Excels in Endurance, Activity and Revivability

Let us Solve Your Purifying Problems

GAS PURIFYING MATERIALS COMPANY INC.

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With the consolidation of sales by the Logan County Coal Corp., and the Amherst Coal Co., we are better than ever prepared to supply

Standard Bituminous Coal for Water and Coal Gas Manufacture

Write for complete data on actual tests, freight rates, or other information.

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1701 Kanawha Valley Building,
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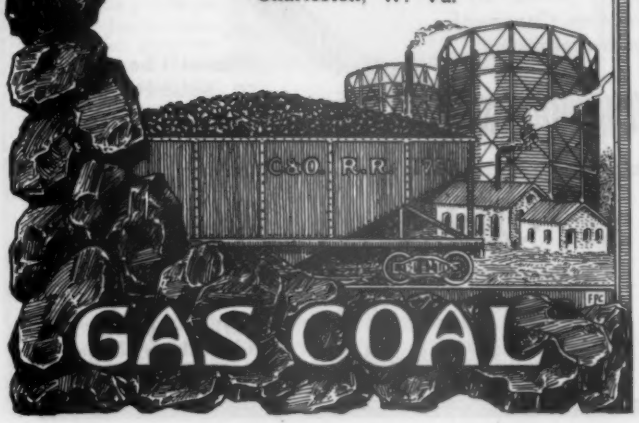
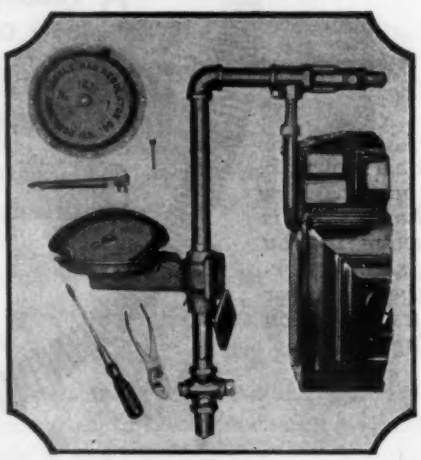


GAS COAL

GROBLE
REGULATORS & GOVERNORS

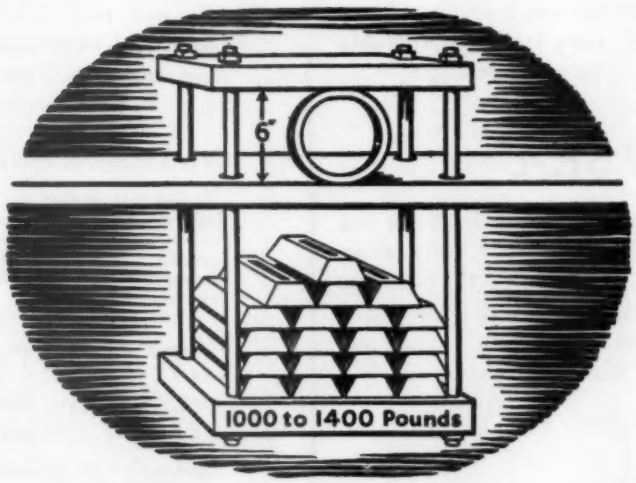


Something To Think About

A Screwdriver and a pair of Pliers are the only tools required to make complete repairs to a GROBLE SERVICE REGULATOR while in the Service Line.

GROBLE GAS REGULATOR COMPANY
Office and Factory—Anderson, Indiana

A deLavaud pipe section one inch wide will support *a load of from 1000 to 1400 lbs.*



THE remarkable ability of deLavaud Pipe to withstand severe crushing strains was demonstrated in a ring-crushing test. This test was conducted by a recognized authority, whose report reads in part as follows:

"Six rings, two each cut from the bell end, the middle, and spigot end of a length of deLavaud pipe picked at random from the manufacturer's stocks, constituted the test samples. These were cut from the pipe band on a lathe and were one inch wide. These rings were quite elastic and the metal appeared to be of a good smooth even grain. Results showed that the load required to cause failure was from 1000 to 1400 lbs."

The facts about deLavaud's great strength are accepted in engineering circles everywhere. It has been definitely proved that deLavaud has 25% greater resistance to internal pressure than good pit cast pipe. The above tests demonstrated deLavaud's ability to withstand tremendous *external* crushing strains.

Those who would know the secret of deLavaud's greater strength need look no further than the microstructure of the metal itself. It is even, close grained and free from slag and blow holes. It is made by pouring molten iron into a rapidly revolving cylindrical mould. Centrifugal force holds the metal against the mould, and drives impurities out *with a force 40 times greater than gravity.*

Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

Let us send you the deLavaud handbook and complete facts and figures about deLavaud Pipe.

United States Pipe and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

AUTUMN DOES NOT SEEM TO FALL FOR

ATLANTIC CITY

this year—summer is still paying her such ardent court and wise folks are enjoying the balmy sea breezes and the pure violet sun rays from comfortable deck chairs on the porches of

THE CHELSEA

which occupies an entire block on the Boardwalk in the heart of the most select section of Atlantic City—THE CHELSEA has a ten-story fireproof addition. Interesting fall rates on American and European plans.

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MITCHELL
ELECTRIC VIBRATING SCREEN

Especially adaptable to the screening of coal and coke. In the re-screening of coke, the terrific vibrations, occurring 3,600 times a minute, remove all breeze at the lowest cost per ton. It requires minimum floor space and head room. It is self-contained, dust and water proof. Requires less than ¾ H. P. per standard screen.

WE DESIGN AND BUILD:

Industrial Railways, Automatic Railways, Cable Railways, Cars, Tracks, Switches, Motor Cars, Scales, Conveyors, Skip Hoists, Electric Vibrating Screens, Cut-off Valves, or Gates, Weighing and Measuring Devices, Coal Crackers, "Stevedore" Transmission Rope.

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HUNT

TRADE MARK

For baking with gas—
***The* MEEK REEL OVEN**

With capacities ranging from 80 to 480 regular size bread pans and using standard equipment, Meek Reel Ovens increase the quantity and quality of the bake and save fuel, time, labor and space. The standard for over a quarter of a century of thousands of bakers in United States, Canada, Mexico, Cuba, Brazil, England, Denmark, Sweden and Russia. Complete information upon request.

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Good Food — 1000 Rooms
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Prompt Service

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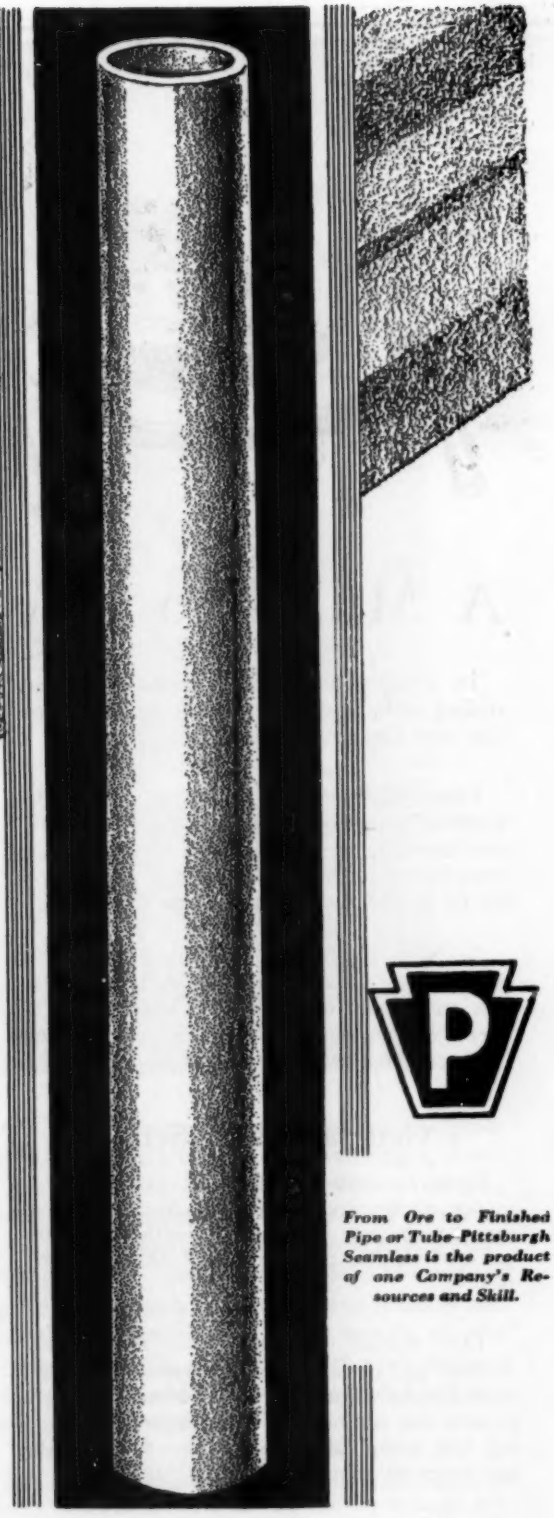
CUT THAT OUT

It may look to be a spot—but out it comes. Every ingot must be carefully inspected—cropped, and, in many cases, a large percentage of the ingot must be discarded. Only perfect steel can measure up to the standard established for Pittsburgh Seamless—a standard of quality resulting from more than a quarter century devoted exclusively to the development and manufacture of seamless steel pipe and tubing.



From Ore to Finished Pipe or Tube Pittsburgh Seamless is the product of one Company's Resources and Skill.

Pittsburgh Steel Products Co.

Division of

Pittsburgh Steel Co.

Pittsburgh P Seamless

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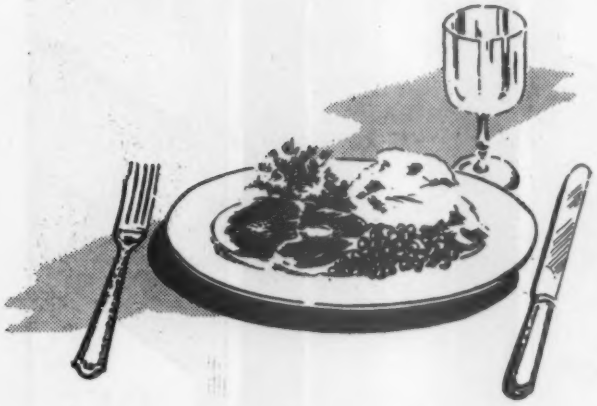
Oil Well Tubing
Drill Pipe
Line Pipe

Sizes ½" to 13⅜" O.D., Lengths up to 45 Feet, depending on Size and Wall Thickness

Pittsburgh New York Chicago St. Louis Detroit Houston Tulsa

2914



A Million a Day

In 350,000 homes three meals a day are cooked with gas supplied by the Associated Gas and Electric System.

From 1921 to 1928 the use of gas by Associated customers increased 31%. Aggressive merchandising of gas appliances by 54 stores is contributing to the increased use of gas in areas served by the Associated System.

In New England where one in every 10 users of gas is an Associated customer there was an increase of nearly 100% during 1928 over 1927 in the installation of gas house heating equipment.

3 Generations of Service

From a company serving 28 gas customers in one community in 1852 the Associated System has become an industry with 1,200,000 gas and electric customers in 2,200 communities.

The number of customers served has doubled and the earnings and assets have more than doubled during the last two years through growth and additions of new properties. During this period also the number of investors has increased from 50,000 to 105,000.

In Booth No. 636 an interesting display will show the territories served.

Associated Gas and Electric System

61 Broadway — New York City

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Published by manufacturers of Gas Equipment and Appliances for you. Order by number, using coupon on Page 148.

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The Western Gas Construction Co. 88

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BALANCE GOVERNORS
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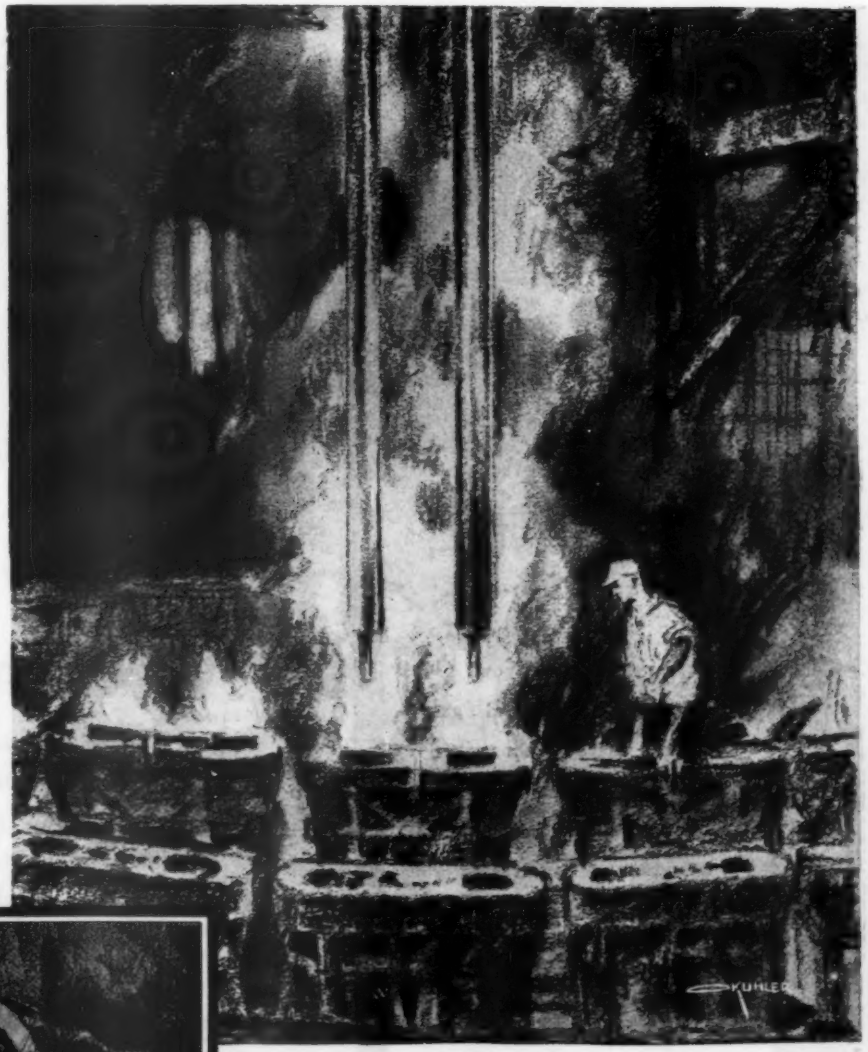

Every cast iron pipe and casting is thoroughly cleaned before being coated. The illustration below shows the modern method of cleaning a large diameter pipe by use of pneumatic tools.

EFFICIENCY is the keynote of the modern cast iron pipe foundry. Efficiency in foundry planning and operation contributes to a better product. For example, each cupola is operated under strict laboratory control. Further along, but within easy reach of the crane, a runway leads to the cleaning sheds where plant inspectors carefully test each pipe length before passing it on to the dipping vats and testing presses. In other words, after a series of operations similar in principle to the production line of a famous motor car plant, the pipe arrives in flawless condition on the waiting cars.

* * *

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Pipe bearing the Association "Q-check" mark may be obtained from the following: American Cast Iron Pipe Co., Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Ave., Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Co., Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe & Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York City.

The "Q-check" symbol shown above has been adopted as the trade mark of The Cast Iron Pipe Research Association. Insist on this "Q-check" mark when specifying cast iron pipe for gas, water, sewer or industrial service.

For complete information write to The Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago.

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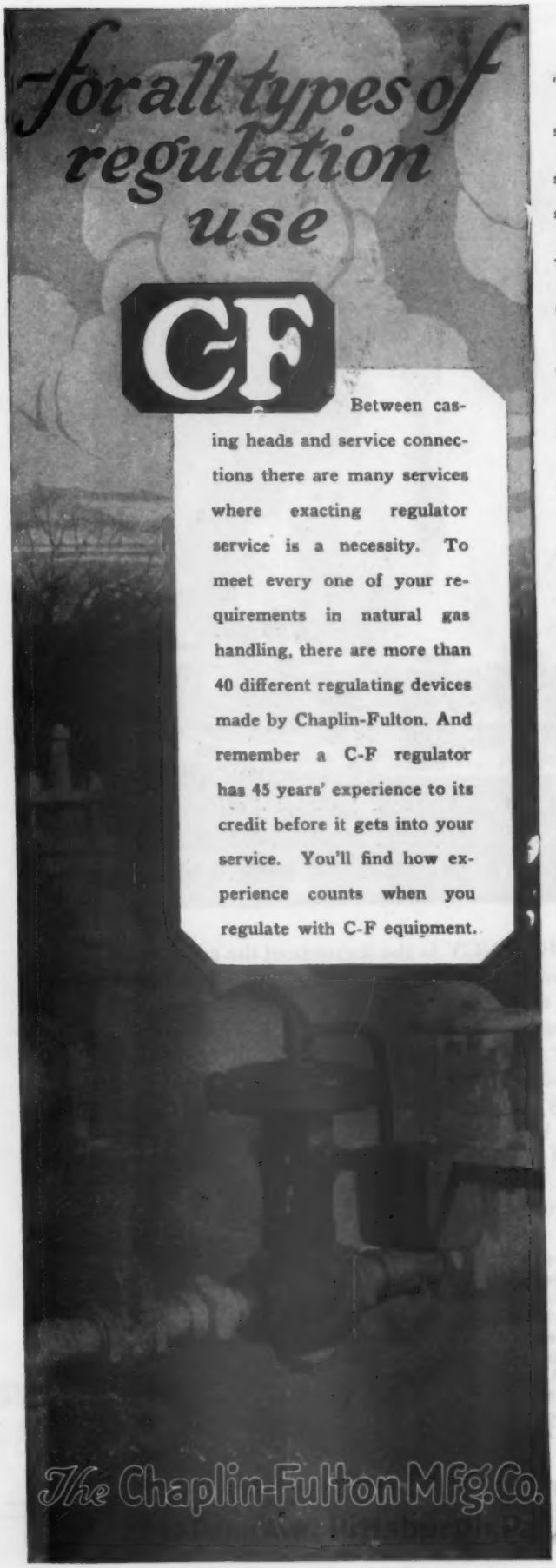
CAST IRON PIPE


for all types of regulation use
C-F
Between casing heads and service connections there are many services where exacting regulator service is a necessity. To meet every one of your requirements in natural gas handling, there are more than 40 different regulating devices made by Chaplin-Fulton. And remember a C-F regulator has 45 years' experience to its credit before it gets into your service. You'll find how experience counts when you regulate with C-F equipment.
The Chaplin-Fulton Mfg. Co.

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Isbell Porter Co. 136

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3
Reasons Why

more and more companies are choosing Naylor Pipe for their pipe line service:

1. STRENGTH: Made with an electric welded spiral lock-seam which provides a truss of great strength.
2. LIGHT WEIGHT: Weighs only half as much as standard weight wrought pipe yet carries the same working pressures. Light weight also means lower handling costs and speedier line laying.
3. PERMANENCY: Made of Toncan Iron to resist rust and corrosion.

Consider these advantages and use Naylor Pipe on your next line.

NAYLOR PIPE COMPANY

Main Office and Plant, 1230 East 92nd Street, Chicago

Sales Offices:

NEW YORK, 25 Church Street — PHILADELPHIA, Witherspoon Bldg. — TULSA, 307 Philtower Bldg.
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Exclusive Distributors:
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UNIQUE TEST MADE ON LINE PIPE

Forcibly Bent 24 Feet From Ditch—Pipe Remains Undamaged.

ROXANA, TEX.—One of the most severe tests to which line pipe can be subjected was made on two 40 foot joints of a section being laid here today.

The object was to see if the pipe could be sharply bent around a stake without breaking.

On the left side of the ditch, a tractor was pulling against the pipe. On the right side, two more tractors were in action pulling the pipe in the opposite direction—one tractor pulling, the other holding down.

While interested spectators watched, the two 40 foot joints, under the tremendous force, gradually were bent at an angle of 17½ degrees—and to a distance of 24 feet from the ditch before finally kinking. No damage whatsoever was done to the pipe.

The kinked joint was then taken out and replaced by a new joint. The same test was then repeated with the same results.

This pipe, so uniquely tested, was Naylor Spiralweld Toncan Iron Pipe—a product of the Naylor Pipe Company Chicago, Illinois.

TONCAN
Naylor Pipe

Mo-lyb-den-um
IRON

Standardized Naylor Pipe is made in sizes 6" to 12" I. D. and 14" to 20" O. D. in any uniform length desired up to 40' 0". Ends made wrought pipe standards for all types of coupling.

Where corrosion resistance is not a factor, Naylor Pipe can be furnished in steel.

Toncan Copper Molybdenum Iron is a development of Central Alloy Steel Corporation, the world's largest and most highly specialized alloy steel producers. It possesses a superior corrosion resistance, making it the favored pipe material.

Recorders of Profits

THE thin, red line traces a record of profits . . . . the chart is the engineer's balance sheet.

Have you ever made a study to determine exactly your one best temperature? And have you taken the time to figure out the profits and losses resulting from any variation from this temperature? Just try it. Sometimes a difference of only a few degrees means hundreds of dollars. American Recording Thermometers give you a record of facts . . . they are Recorders of Profits.

This is Type 3300 American Recording Thermometer. It is actuated by mercury. Made for any temperature range from minus 40 to plus 1000° F. The chart is 10 in. in diameter. The case is die cast with a beautiful black enamel finish. It is moisture proof. The pen-arm is Monel metal, and glass fountain pens are used. The flexible connecting tubing is steel covered by spiral bronze armor over which phosphor bronze braiding is woven. It is the only Recorder furnished with the Time Punch, making every instrument a Watchman's Clock. Accuracy is guaranteed. Compare its construction and accuracy by test!

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American Recording Thermometers	H-7
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American Recording Gauges	E-7
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SINCE 1851

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Bridgeport, Conn.
Subsidiary of Manning, Maxwell & Moore, Inc.

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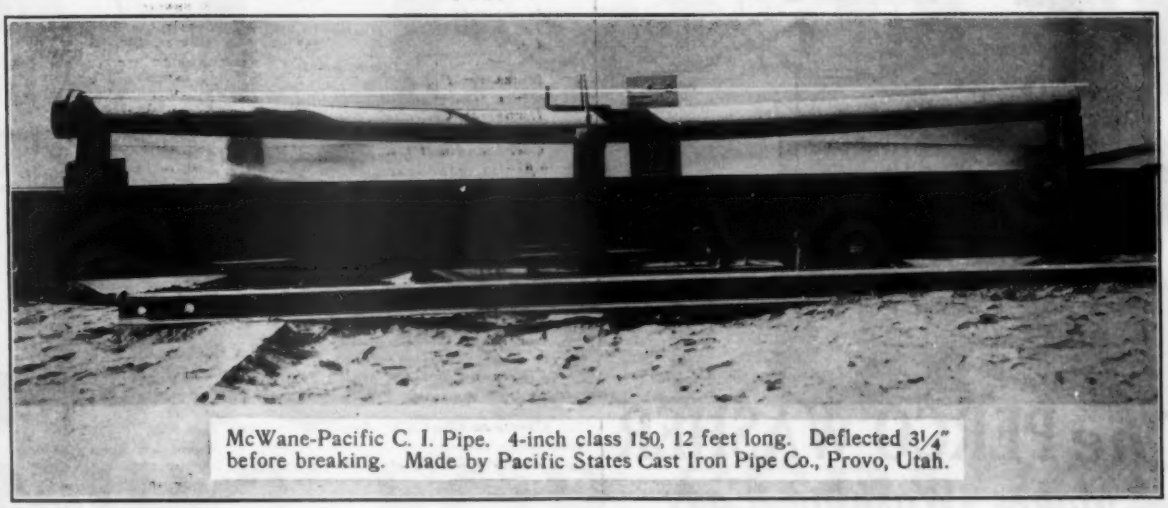

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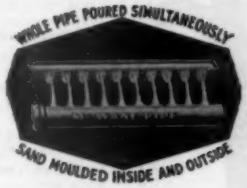

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Apparatus

LAMBERT METER CO.
BUSH TERM. BLDG. 4, BROOKLYN, N. Y.

Byllesby Engineering and Management Corporation

BYLLESBY
ENGINEERING MANAGEMENT FINANCE
PIONEERS IN PUBLIC SERVICE

CHICAGO NEW YORK
Pittsburgh San Francisco

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COUPLINGS
Bartlett-Hayward Co.
S. R. Dresser Mfg. Co.
National Tube Co.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company.
Victaulic Co. of Amer.

COUPLINGS—FLEXIBLE
The P. H. & F. M. Roots Company.

CUBIC FOOT BOTTLES
Superior Meter Co.

CUTTING APPARATUS & SUPPLIES
Union Carbide & Carbon Co.

CRUSHERS
Riter-Conley Company.

CUBIC FOOT BOTTLES
American Meter Co.
Lambert Meter Co.

DE-EMULSIFIERS
Semet-Solvay Engineering Corp.
The Western Gas Construction Company.

DEHYDRATORS, GAS
Andale Company.
Semet-Solvay Engineering Corp.
West Gas Improvement Co.
The Western Gas Construction Company.

DEMONSTRATION METERS
Lambert Meter Co.

DIAPHRAGMS (Meter)
Lambert Meter Co.
Superior Meter Co.
American Meter Co.

DISCHARGING MACHINERY
Bartlett-Hayward Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.

DRAFT GAUGES
Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.

DRYERS (Laundry)
Judelson Dryer Corpn.
W. E. Lamneck Co.

ELECTRIC LOCOMOTIVES
C. W. Hunt Co., Inc.

ELEVATORS
C. W. Hunt Co., Inc.
Craig Ridgway & Son Co.
Robins Conveying Belt Co.

ENGINE INDICATORS
Consolidated Ashcroft Hancock Co., Inc.

ENGINEERS
American Meter Co.
The Gas Machinery Co.
Combustion
Bartlett-Hayward Co.
The C. M. Kemp Mfg. Co.
Smoot Engineering Corp.
United Engineers & Constructors, Inc.
Consulting
Bartlett-Hayward Co.
Edw. A. Dieterle
United Engineers & Constructors, Inc.
George H. Waring.
The Western Gas Construction Company.
Contracting
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Company.
C. W. Hunt Co., Inc.
Isbell-Porter Company.
Riter-Conley Company.
Stacey Gros. Gas Const. Co.
United Engineers & Constructors, Inc.
West Gas Improvement Co.
The Western Gas Construction Company.
Distribution
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Measurement
American Meter Co.

EXHAUSTERS
Connersville Blower Co., The
The Gas Machinery Co.
Isbell-Porter Company.
The P. H. & F. M. Roots Company.
The Western Gas Construction Company.

EXPANSION BENDS
The Gas Machinery Co.
Semet-Solvay Engineering Corp.

FILES (Steel and Wood)
Remington Rand, Inc.

FILES (Visible)
Remington Rand, Inc.

FILTERS, Gas
American Meter Co.

FIREBRICK, CEMENT
General Refractories Co.
Quigley Furnace Specialties Co., Inc.

FIREBRICK CHECKER BRICK (See Brick)
Botfield Refractories Company.
The Gas Machinery Co.
General Refractories Co.
Improved Equipment-Russell Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FIRST AID EQUIPMENT
United Engineers & Constructors, Inc.

FITTINGS
Isbell-Porter Company.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
U. S. Cast Iron Pipe and Foundry Co.
The Western Gas Construction Company.
Plain End and Flanged
Cast Iron Pipe Research Association.

FIXTURES
American Lava Corp.

FLOORS, IRON, BRICK, AND STEEL
The Gas Machinery Co.
Riter-Conley Company.
Semet-Solvay Engineering Corp.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

FLOW METERS
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Lambert Meter Co.

FLUE PIPE (Cast Iron Oval)
Semet-Solvay Engineering Corp.

FURNACES
Combustion Engineering Corpn.
Gas Fired
The C. M. Kemp Mfg. Co.
Gas Soldering
American Meter Co.

GAS ANALYSIS APPARATUS
Metric Metal Works.

GASKETS
American Meter Co.
Consolidated Ashcroft Hancock Co., Inc.
Pittsburgh Equitable Meter Co.
Superior Meter Co.

GAS COAL
Boone County Coal Corpn.

GASOMETERS (Test)
American Meter Co.

GAS PLANTS, COMPLETE
Indugas, Inc.
Gas Engineering Co.
Isbell-Porter Company.
United Engineers & Constructors, Inc
West Gas Improvement Co.

GASSING MACHINE
American Meter Co.
Lambert Meter Co.
Superior Meter Co.

GAS TAPE
Connelly Iron Sponge & Governor Co.

GAS TESTING APPARATUS
Metric Metal Works.

GATE VALVES (See Valves)

GATES—WIND & BLAST
The P. H. & F. M. Roots Company.

GAUGE BOARDS
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

GAUGES
American Meter Co.
The Bristol Company.
Brown Instrument Co., The
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Lambert Meter Co.
Maryland Meter Co.
Metric Metal Works.
Pittsburgh Equitable Meter Co.
The P. H. & F. M. Roots Company
Superior Meter Co.
Taylor Instrument Companies.
Tagliabue Mfg. Co., C. J.
The Western Gas Construction Company.
Mercury
Precision Thermometer & Instrument Company.
Pressure-Recording
Consolidated Ashcroft Hancock Co., Inc.
D. McDonald & Co.
Precision Thermometer & Instrument Company.
Tagliabue Mfg. Co., C. J.
Siphon
Precision Thermometer & Instrument Company.
Tank
Precision Thermometer & Instrument Company.
Water
Precision Thermometer & Instrument Company.

GLOVES
Rubber
Safety Gas Main Stopper Co.

GOVERNORS
Pittsburgh Equitable Meter Co.
Automatic
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Gas Industries Laboratories.
Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.

GOVERNORS (Calorimeter and Double Dry)
American Meter Co.
Coke Oven
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
District
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Heime & McIlhenny.
Isbell-Porter Co.
Smoot Engineering Corp.
Exhauster
Connelly Iron Sponge & Governor Co.
Connersville Blower Co., The
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Isbell-Porter Co.
The P. H. & F. M. Roots Company.
Smoot Engineering Corp.
High Pressure
The Chaplin Fulton Mfg. Co.
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Groble Gas Regulator Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
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Laboratory
American Meter Co.
Connelly Iron Sponge & Governor Co.
Lambert Meter Co.
D. McDonald & Co.
Reynolds Gas Regulator Co.
Low Pressure
The Chaplin Fulton Mfg. Co.
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Lambert Meter Co.
Reynolds Gas Regulator Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Retort House
Isbell-Porter Company.
Station
Heime & McIlhenny.

GRATES for Water Gas Generators
Semet-Solvay Engineering Corp.

GRAVITOMETERS
Precision Thermometer & Instrument Company.

GRIDS, for Scrubbers
Semet-Solvay Engineering Corp.

HEATERS
Feed Water
Andale Company.
House
American Gas Products Corp.
American Stove Company.
Homestead Heater Company.
Welsbach Company.
The Cleveland Heater Company.
Humphrey Company.
Kompak Company.
Welsbach Company.
Pittsburg Water Heater Co.

HIGH CAPACITY METERS
Lambert Meter Co.

HIGH PRESSURE PIPE LINES
The Western Gas Construction Company.

HOISTS
The Gas Machinery Co.
C. W. Hunt Co., Inc.

HOLDERS
Bartlett-Hayward Co.
Cruse-Kemper Co.
Gas Engineering Co.
Riter-Conley Company.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.

HOPPERS—COAL AND COKE
Bartlett-Hayward Co.
Cruse-Kemper Co.
C. W. Hunt Co., Inc.
Riter-Conley Company.
The Stacey Mfg. Co.

HOTELS
Shelburne Hotel.

HOWARD AUTOMATIC CHARGERS
The Western Gas Construction Company.

HYDROGEN GAS APPARATUS
Bartlett-Hayward Co.
Gas Engineering Co.
Improved Equipment-Russell Engineering Corp.
Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.

HYDROGEN SULPHITE TEST (Apparatus)
American Meter Co.

HYDROMETERS
The Brown Instrument Co.
Precision Thermometer & Instrument Company.
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INCINERATORS, GAS-FIRED
Kernit Incinerator Co.

INDUSTRIAL GAS MIXERS
The C. M. Kemp Mfg. Co.
Roberts Gas Burner Corp.
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INDUSTRIAL TRACK
C. W. Hunt Co., Inc.

IRON BORING OXIDE
Gas Purifying Materials Co., Inc.

IRON SPONGE
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Hurley Machine Company.

INSTRUMENTS
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Brown Instrument Co., The
Consolidated Ashcroft Hancock Co., Inc.
Lambert Meter Co.
Metric Metal Works.
Precision Thermometer & Instrument Company.
Taylor Instrument Companies.
Time-O-Stat Controls Co.

Every Gas Plant Needs

ADAMANT Fire Brick Cement

ADACHROME *Fines*

ADACHROME *Aggregate*

ADACHROME Plastic Super-Cement

ADAPATCH (fire brick in plastic form)

The ADAMANT Gun

Refractory coatings, applied frequently on generator linings and boiler settings by means of The ADAMANT Gun, protect refractories from destructive actions and add to brickwork life.

If you will send us an outline of your refractories difficulties, we shall be glad to submit suggestions, and also send you a copy of the ADAPRODUCTS book. Write us today.

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World's Largest Exclusive Manufacturer of High Temperature Cement

Swanson and Clymer Streets, Philadelphia, Pa.

HOMESTEAD FIRES

Radiant "Coalfires"

Radiant "Woodfires"

Homestead Heater Company, Inc.

Selvage St. and Fabyan Pl., Newark, N. J.

The New 1928 Improved FRANKLIN Gas Burner—

Positively the last word in the practical and efficient combustion of the gases in which air and gas are mixed to the highest degree of perfection. Easily and quickly installed. Can be used on any coal-fired boiler or hot air furnace.

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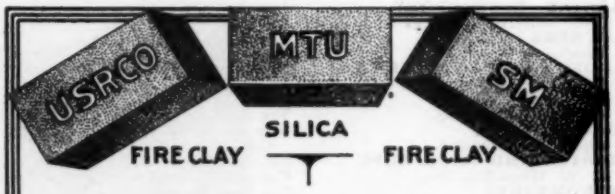
THE FRANKLIN GAS APPLIANCE CO.

CINCINNATI, OHIO



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FINE GROUND CLAY — SILICA CEMENT

U·S·REFRACTORIES CORPORATION

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The Pittsburg Water Heater Company

Pittsburgh, Pa.

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Consulting Engineer

Peoples Gas Building

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JOHN S. UNGER

GAS ENGINEER

Specialist in Ammonia Recovery and Manufacture of Ammonia Products.

Builder of Unger Ammonia Stills

640 GRACE ST., CHICAGO

ISBELL-PORTER COMPANY

Engineers and Contractors for Complete Gas Works

I-P C

Manufacturers of All Kinds of Gas Apparatus

NEWARK · NEW JERSEY

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Cheesman-Elliott Co.
Quigley Furnace Spec. Co., Inc.
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Hedges-Walsh-Weidner Co.
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McWane Cast Iron Pipe Co.
U. S. Cast Iron Pipe & Foundry Co.
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The Stacey Mfg. Co.
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Soft Wood
Safety Gas Main Stopper Co.
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Superior Meter Co.
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Semet-Solvay Engineering Corp.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.
PRODUCER GAS STEAM
American Meter Co.
PROVERS—Critical Flow for H. P Field Testing
American Meter Co.
PROVERS—METER
John J. Griffin & Company.
Helme & McIlhenny.
Lambert Meter Co.
D. McDonald & Co.
Pittsburgh Equitable Meter Co
Superior Meter Co.
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Drip
American Meter Co.
The Gas Machinery Co.
Lambert Meter Co.
D. McDonald & Co.
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The P. H. & F. M. Roots Company.
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Hand
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Oil
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D. McDonald & Co.
The P. H. & F. M. Roots Company.
Power
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The P. H. & F. M. Roots Company.
Pressure
Connersville Blower Co., The
The P. H. & F. M. Roots Company.
Service
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Superior Meter Co.
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American Meter Co.
John J. Griffin & Company.
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Safety Gas Main Stopper Co.
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Cruse-Kemper Co.
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Isbell-Porter Company.
The Koppers Construction Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas. Const. Co.
The Stacey Mfg. Co.
Riter-Conley Company.
United Engineers & Constructors Inc
The Western Gas Construction Company.

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Advertising in most instances, does nothing more nor less than create impressions on the minds of prospective users.

The great advantage of the impressions created by a good calendar, is the fact that they are delivered to the minds of the same people every day, sometimes ten or more times and obviously daily reminders will make more sales than occasional reminders. It is in reality "Poster Advertising" in nine colors right in the home of your customer or prospective one, selling both Good Will and Merchandising at a cost of about one half a penny a month, that is in the form of a souvenir, displayed in your customers home. Samples are now available.

Sign and Mail coupon today.

AMERICAN GAS JOURNAL
53 Park Place, New York

Send further information regarding "Giving America Service" Art Calendar, for 1930.

Company .....

City .....

State .....

Position .....

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PURIFYING MATERIALS
Alpha-Lux Company.
Connelly Iron Sponge & Governor Co.
The Gas Machinery Co.
Gas Purifying Materials Co., Inc
The Koppers Construction Co.
E. J. Lavino & Co.

PURIFIER TRAYS
Bartlett-Hayward Co.
Connelly Iron Sponge & Governor Co.
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The Gas Machinery Co.
Semet-Solvay Engineering Corp.
Stacey Bros. Gas Const. Co.
The Stacey Mfg. Co.
United Engineers & Constructors, Inc.
The Western Gas Construction Company.

PYROMETERS
The Brown Instrument Co.
Maryland Meter Works
The Bristol Company.
The Western Gas Construction Company.
Indicating
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.
Radiation
Taylor Instrument Companies.
Recording
The Gas Machinery Co.
Taylor Instrument Companies.
United Engineers & Constructors, Inc.

RADIATORS
Gas Steam
American Gas Products Corp.

RANGES—GAS
American Stove Co.

RECORDERS—LIQUID LEVEL
The Brown Instrument Co.

RECORDING DEMAND METERS
The Brown Instrument Co.
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Maryland Meter Works

REFRACTORY CEMENTS
Botfield Refractories Company
The Gas Machinery Co.
General Refractories Co.
Improved Equipment—Russell Engineering Corp.
E. J. Lavino & Co.
Quigley Furnace Spec. Co. Inc.
United States Refractories Corp.

REFRACTORY GUN
Botfield Refractories Company
Quigley Furnace Spec. Co. Inc.

REFRACTORY LININGS
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General Refractories Co.
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Quigley Furnace Spec. Co. Inc.
United Engineers & Constructors Inc.
The Western Gas Construction Company
United States Refractories Corp.

REFRIGERATORS—GAS
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REGULATORS
American Meter Co.
The Brown Instrument Co.
The Chaplin Fulton Mfg. Co.
Connersville Co., The
Connelly Iron Sponge & Governor Co.
Groble Gas Regulator Co.
Isbell-Porter Co.
Pittsburgh Equitable Meter Co.
Reynolds Gas Regulator Co.
Robertshaw Thermostat Co.
Smoot Engineering Corp.
The Sprague Meter Co.
Taylor Instrument Companies
Air Pressure
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Smoot Engineering Corp.
Coke Oven Suction Main
Smoot Engineering Corp.
Exhauster
Smoot Engineering Corp.
Furnace Pressure
Smoot Engineering Corp.
Oven
American Stove Co.
Steam Pressure
Smoot Engineering Corp.

REPAIR PARTS
Lambert Meter Co.

RESPERATING OUTFITS
Connelly Iron Sponge & Governor Co.

RETORTS
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